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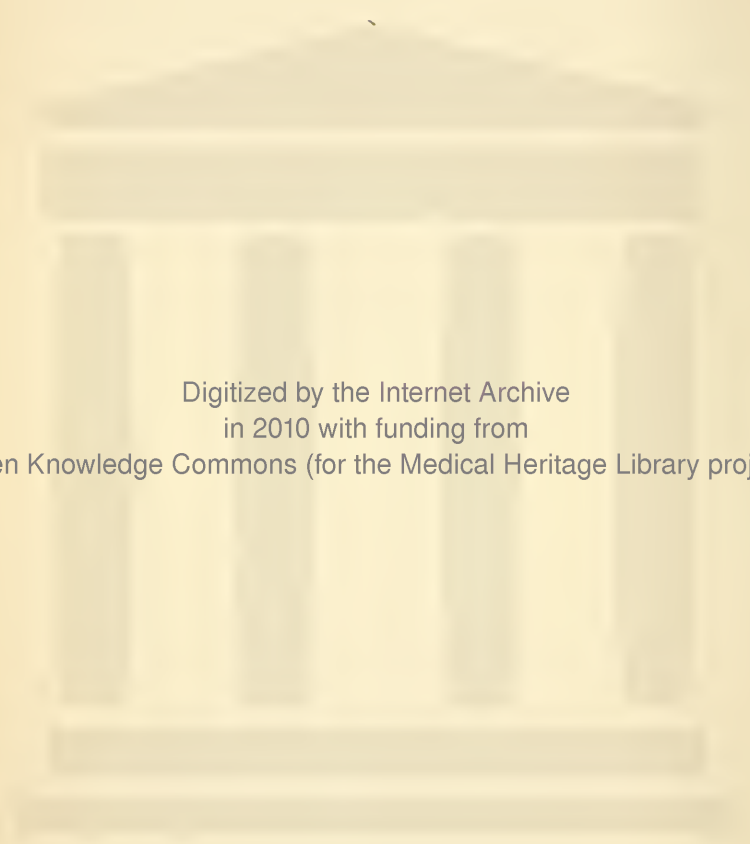
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CENTENNIAL YEAR.

ANNUAL REPORT

OF THE


SUPERVISING SURGEON-GENERAL

OF THE

MARINE-HOSPITAL SERVICE OF THE UNITED STATES

FOR THE

FISCAL YEAR 1898.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1899.

1890
1891
1892

TREASURY DEPARTMENT,
Document No. 1449.
Office of U. S. Marine-Hospital Service.



OPERATIONS
OF THE
UNITED STATES MARINE-HOSPITAL SERVICE.
1898.

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CONTENTS.

	Page.
Report to the Secretary.....	15
Medical Corps:	
Board convened for the examination of applicants.....	15
Appointments and promotions.....	15
Resignation.....	16
Casualties.....	16
Death of P. A. Surg. W. D. Bratton.....	16
Death of Asst. Surg. Emil Prochazka.....	16
Officer on waiting orders on account of physical disability.....	17
Act for the relief of the legal representatives of the late Asst. Surg. John W. Branham, approved June 15, 1898.....	17
Officers detailed to represent the Service at meetings of medical and public health associations.....	18
Report of Surg. J. M. Gassaway on the meeting of the American Public Health Association, Denver, Colo.....	18
Report of Surg. Charles E. Banks on the meeting of the Ninth International Congress of Hygiene and Demography, Madrid, Spain.....	20
Report of Surg. Charles E. Banks on hospital equipment, ward furniture, etc., in certain hospitals of Spain, France, and England.....	23
Report of P. A. Surg. S. D. Brooks on the meeting of the Wash- ington State Medical Society.....	27
Revision of the regulations.....	27
Information for those desiring to enter the medical corps of the Marine- Hospital Service.....	27
Circular letter.....	27
Application blank.....	32
Specimen set of examination questions.....	32
Aid to other branches of the Government service:	
United States Army and Navy.....	33
Correspondence relating thereto.....	34
Department circular approved by the President.....	35
Circular—rate of charge.....	36
Circular—Coast Signal Service (U. S. N.).....	36
Summary of relief furnished.....	36
Acknowledgment of aid to Coast Signal Service (U. S. N.).....	37
Aid to the United States Revenue-Cutter Service.....	38
Aid to the United States Life-Saving Service.....	38
Aid to the Inspection Service of Steam Vessels.....	38
Aid to the Immigration Service.....	38
Trans-Mississippi Exposition at Omaha.....	40

	Page
Shelter for deck crews on Western rivers	40
Department circular calling attention to section 2, act of Congress approved March 3, 1897, providing such shelter	40
Case of the steamer Anna B. Adams	41
Reports to be made of the deaths of foreign seamen	42
Circular issued by the Bureau of Navigation	42
Tonnage tax	42
President's proclamation discontinuing such tax in the case of vessels arriving at United States ports direct from Copenhagen	43
Marine hospitals and relief furnished:	
Summary of patients treated	44
Inspection of stations of the first, second, third, and fourth class (blank forms)	44
Statement by stations of repairs and alterations made and needed	52
Contracts for the care of seamen—Department circular	60
Circular letters relative to administrative details	68
Leaves of absence for acting assistant surgeons	69
Promulgating certain paragraphs of the revised regulations	69
Employment of attendants under civil-service rules	70
Promulgating change in uniform regulations	70
Inquiry as to experience in the diagnosis and treatment of variola ...	71
Accommodations for sick and wounded officers of the United States Revenue-Cutter Service at stations where there is no United States marine hospital	71
Concerning post-mortem examinations: specimens to be forwarded to the hygienic laboratory	71
Report of the purveying division	72
Financial statement	77
Reports of fatal cases, with necropsies	83
Contributed articles:	
Report on a case of Raynaud's disease. By P. A. Surg. P. C. Kalloch.	230
Location of bullet by X-ray. Rupture of traumatic aneurism; estab- lishment of collateral circulation after double ligation of the main artery of the limb: ultimate result in doubt. By P. A. Surg. R. M. Woodward	231
Anthrax oedema. By P. A. Surg. W. P. McIntosh	233
Observations, comments, and statistics on the diagnosis, climatic isolation, and future control of the consumptive sailor. By P. A. Surg. J. O. Cobb	236
Femoral hernia—Operation (Bassini's)—Recovery. By P. A. Surg. J. B. Stoner	251
Cases from hospital practice. By P. A. Surg. George B. Young	252
A portable operating room (illustrated). By Asst. Surg. L. E. Cofer ..	260
Severe lacerated wound of the foot involving the bones of the foot. metatarso-phalangeal junction, etc. By Asst. Surg. J. H. Oakley ..	262
Toxic amaurosis—Recovery. By Asst. Surg. J. B. Greene	263
Herniotomies. By Asst. Surg. H. S. Mathewson	264
The radical cure of hernia, with report of cases. By Acting Asst. Surg. J. B. Eagleson	267
Reports on tuberculosis in Rio de Janeiro and on the etiology of beri- beri. By Acting Sanitary Inspector W. Havelburg	280
Statistics of the Pasteur Institute at Rio de Janeiro and a report on the Vaccination Institute in that city for the year 1897. By Acting Sanitary Inspector W. Havelburg	283

	Page
Articles on yellow fever, its nature, diagnosis, treatment, and prophylaxis, and quarantine regulations relating thereto:	
Letter to the Secretary	287
Diagnosis of yellow fever:	
Circular letter. By Surg. R. D. Murray	289
Diagnosis of yellow fever. By Acting Asst. Surg. John Guit��ras	296
Treatment of yellow fever:	
The treatment of yellow fever. By Surg. R. D. Murray	301
Therapeutic treatment of yellow fever. By P. A. Surg. H. D. Geddings	313
Hygienic measures to be adopted by persons living within an area of yellow fever infection:	
By Surg. H. R. Carter	319
By P. A. Surg. Eugene Wasdin	330
By P. A. Surg. H. D. Geddings	333
By Sanitary Inspector W. F. Brunner	335
Prevention of the spread of yellow fever:	
Measures to be adopted in towns infected with yellow fever. By Surg. H. R. Carter	339
Measures to be adopted in a district threatened by yellow fever. By Surg. H. R. Carter	358
Measures to be adopted in infected and noninfected towns. By P. A. Surg. A. H. Glennan	361
Measures to prevent the propagation of yellow fever from an infected to a noninfected locality. By Asst. Surg. Seaton Norman	367
Regulation of traffic to, from, and through infected towns. By P. A. Surg. J. H. White	370
Communication with an infected town. By Surg. H. R. Carter	373
Detention camps and camps of observation. By P. A. Surg. J. H. White	378
Train inspection service. By P. A. Surg. George B. Young	389
Synopsis of interstate quarantine regulations. By P. A. Surg. J. H. White	412
Maritime quarantine against yellow fever:	
Pr��cis of United States quarantine regulations to prevent introduction of yellow fever. By Surg. Preston H. Bailhache	415
A concise explanation of the maritime quarantine regulations of the Treasury Department. By P. A. Surg. J. H. White	431
Post-epidemic disinfection:	
Circular letters issued by the Marine-Hospital Bureau relating thereto	425
Present status of the bacteriology of yellow fever. By P. A. Surg. E. K. Sprague	428
On the value of autopsic findings in cases that have died from suspected yellow fever. By P. A. Surg. Eugene Wasdin	432
Train inspection:	
A contributed article by Surg. H. R. Carter, prepared at the close of the epidemic of 1898	441
Statistics, United States Marine-Hospital Service	455

PUBLIC HEALTH SERVICE.

Cholera:	
Annual history of the prevalence of, and table showing the geographical distribution	527

Yellow fever:	Page.
In the United States—	
Supplemental facts concerning the yellow fever epidemic of 1897..	529
Origin of the epidemic of 1897.....	529
False reports against the United States quarantine station at Ship Island, Mississippi, and refutation thereof.....	529
Report of P. A. Surg. J. H. White, on the source of the fever in 1897 at Ocean Springs, Miss.....	536
Post-epidemic disinfection throughout the South.....	539
Bureau orders relating thereto.....	540
Yellow fever outbreak in Louisiana and Mississippi in the summer and fall of 1898.....	544
The outbreak in McHenry, Miss.....	544
Resolution conveying thanks of Louisiana State Board of Health.....	550
The epidemic in Franklin, La.....	550
Report of Surg. P. C. Kalloch.....	553
Spread of the fever in Louisiana and Mississippi.....	556
Weekly statement of spread and measures taken.....	558
General description of Service measures.....	565
Source of the yellow fever infection in Mississippi.....	570
Report of P. A. Surg. J. O. Cobb.....	570
In other countries—	
Localities where present—	
History of yellow fever in Rio de Janeiro since the year 1849, with statistical tables.....	580
Table, yellow fever in foreign countries.....	583
Investigation by the United States Marine-Hospital Service of the causes of yellow fever.....	584
Preliminary report of yellow fever commission—	
Report of Surg. Eugene Wasdin.....	587
Report of P. A. Surg. H. D. Geddings.....	590
Report of Surg. Eugene Wasdin on the antiamaryllic serum of Professor Sanarelli.....	593
Smallpox in the United States:	
Annual history of.....	598
Cooperation with State and local boards of health in the suppression of epidemics of smallpox during 1898.....	600
Report on the epidemic of smallpox at Birmingham, Ala., and vicinity.....	600
Report on the epidemic of smallpox at Middlesboro, Ky.....	613
Government aid to smallpox sufferers at Fair Oaks, Ark.....	622
Investigation and advisory aid at Charlotte, N. C.....	623
Investigation and advisory aid at Little Rock, Ark.....	624
Investigation and advisory aid at Columbia and Sumter, S. C.....	625
Table showing geographical distribution of smallpox during the year ending October 1, 1898.....	628
Principles governing extension of aid in smallpox.....	630
Plague:	
Reports on the plague in India.....	632
Epidemic in Bombay.....	632
Infection in other Indian cities.....	634

Plague—Continued.	Page.
Report on the plague in Calcutta. By the United States consul-general.....	635
Plague in other countries.....	635
Regulations to prevent introduction of plague into Morocco.....	638
Russian and French restrictions on the pilgrimages.....	640
Strict enforcement of preventive measures urged upon the Ottoman Government.....	641
Haffkine's serum—preventive inoculation.....	641
Leprosy:	
Report on leprosy in Japan.....	643
Report on leprosy in the Kingdom of Denmark.....	644
Translation of certain laws on the subject of leprosy in force in that country.....	644
Bill for the investigation of leprosy in the United States.....	646
National quarantine administration (foreign):	
Foreign sanitary inspection service.....	649
Sanitary inspection at Habana, Cuba.....	649
Vaccination, at Habana, of persons departing for the United States.....	650
Sanitary inspection at Santiago de Cuba.....	651
Sanitary inspection at Rio de Janeiro, Brazil.....	651
Statement of occurrence of yellow fever on shipping.....	651
Sanitary inspection at Yokohama, Japan.....	652
Report on inspection of vessels and passengers for the United States during the fiscal year 1898.....	652
Report of epidemic dysentery.....	655
Sanitary inspection at Honolulu, Hawaiian Islands.....	655
Preliminary report of Surg. D. A. Carmichael.....	656
Method of inspection of emigrants at Naples, Italy.....	659
Report on the inspection of the William Head Quarantine Station, British Columbia, by Surg. S. D. Brooks.....	667
National quarantine administration (domestic):	
Yellow fever precautions in the spring and summer of 1898:	
Inspectors.....	670
Special regulations for naval war vessels.....	670
Correspondence with Navy Department.....	671
Navy requested to intercept small craft and refugees from Cuba.....	671
Navy Department to forbid transportation of refugees or effects from Cuba and to require observance of usual quarantine regulations on part of prize vessels and auxiliary vessels.....	672
Correspondence with War Department in re transports—not to bring refugees, clothing, or baggage, and to submit to regular quarantine regulations, May 31, 1898—reply July 16.....	672
Efforts to prevent landing of sick and wounded and refugees from Cuba at southern ports.....	674
Letter to Surgeon-General Sternberg, U. S. A.....	674
Protest of Portsmouth, Va., board of health.....	675
Protest from Port Tampa, Fla.—letter to Secretary of War..	675
Orders to collector of customs, Port Tampa.....	676
Quarantine authorities sustained notwithstanding war measures—letter to state health officer of Florida.....	676

National quarantine administration (domestic)—Continued.	Page.
Yellow fever precautions in the spring and summer of 1898—Cont'd.	
Detention Camp at Egmont Key	677
Disinfection of the steamer Nietheroy—afterwards U. S. cruiser	
Buffalo	682
Detail of board to report on sanitary condition of vessel....	683
Report of board	684
Correspondence with the Navy Department	685
Precautions recommended regarding return of troops from Santi-	
ago to Montauk Point	686
Telegraphic orders issued by the War Department	689
United States maritime quarantine at Montauk Point	690
Army transport and port inspection service	693
Correspondence with Secretary of War	693
Official orders—War Department	694
Officers of the Marine-Hospital Service detailed to serve on	
Government transports	694
Instructions	695
Reports of Asst. Surg. A. R. Thomas on Obdam	696
Report of Asst. Surg. C. H. Lavinder on Manitoba	700
Report of Asst. Surg. Sherrard R. Tabb on Manitoba	703
Report of Asst. Surg. John McMullen on Mississippi	705
Reports of Asst. Surg. S. B. Grubbs on Chester	707
Report of Asst. Surg. H. B. Parker on Minnewaska	712
Report of Acting Asst. Surg. J. S. Hough on Ronmanian	714
Texas border inspectors and guards	716
Treatise on yellow fever	716
Investigation of reported cases of yellow fever at Key West, Fla.;	
Tampa, Fla.; Fort Point (near Galveston), Tex.; Portsmouth,	
N. H.; Fort Monroe, Va.; Brownsville, Tex., and Varner, La. .	716
No yellow fever admitted to the United States during 1898	718
Amendments to quarantine regulations—quarantine circulars	718
Addition to regulations—	
Disinfection by formaldehyd gas	718
Special regulations relating to naval vessels	719
Consular bills of health	719
Inspection of certain vessels and baggage on and after April 1	
and until November 15	720
Vessels from infected ports, bound for Apalachicola, Fla., to proceed	
first to a disinfecting station	720
Reports from the national quarantine stations—transactions, repairs,	
and improvements during the fiscal year 1898—	
Reedy Island Quarantine	721
Delaware Breakwater Quarantine	722
Cape Charles Quarantine	723
Cape Fear Quarantine	725
South Atlantic Quarantine	726
Brunswick Quarantine	728
Tortugas Quarantine	728
Gulf Island Quarantine	730
San Diego Quarantine	735
San Francisco Quarantine	737
Port Townsend Quarantine	739

National quarantine administration (domestic)—Continued.	Page.
Report on the establishment of a national quarantine station at Astoria, Oreg	740
Detail of board for selection of site	741
Floating quarantine plant Protector	741
Relations with State and local health authorities:	
Relations harmonious	745
Replies to criticism	745
Letters of appreciation from State authorities	745
National quarantine legislation:	
Senate bill 2680 and House bill 4363—genesis and history of	745
Bureau of public health bill—genesis and history of	747
Mobile and Atlanta conventions	748
Service attitude toward conventions and associations	748
Legislation needed	748
Increase of clerical force in Bureau	749
Senate bill 2680 in full as reported	749
Report on by Senate Committee on Public Health and National Quarantine	752
House bill 4363 as reported	757
Letter of Secretary of Treasury	760
Statement of Surgeon-General relating thereto	761
Report of Committee on Interstate and Foreign Commerce of the House of Representatives	766
Minority report	771
Division of sanitary reports and statistics:	
Public health reports	773
Table of yearly mortality, cities of the United States, 1897	776
Transportation of dead bodies in the United States	801
National regulations relating thereto	801
Inquiry into the rules and regulations of the several State boards of health in regard to the transportation of dead bodies	802
Circular letter addressed to State boards of health	802
Abstracts of replies received	802
Report of the hygienic laboratory:	
Special investigations	808
Infections caused by the pneumococcus	808
Pseudo-diphtheria bacillus	808
Bacillus typhosus	809
Etiology of variola	809
Bacteriological examination of the Potomac water supply	809
Laboratory instruction to officers of the Service	824
Car sanitation	824
Measures to obtain material for pathological instruction	825
Microscopical and chemical examinations	825
Prospectus of laboratory work during 1899	826
Recommendations	826
Report on the best method of disinfecting mail matter	826
Acknowledgments	828

CENTENNIAL YEAR.

REPORT TO THE SECRETARY.

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL M. H. S.,
November 1, 1898.

Hon. L. J. GAGE,
Secretary of the Treasury.

SIR: I have the honor to herewith transmit the report of the Marine-Hospital Service of the United States for the fiscal year ended June 30, 1898, being the twenty-seventh annual report of the Service and the one hundredth year of its existence.

In addition to the information pertaining to the fiscal year 1898, the operations of the Service as regards quarantine and public health matters are included to the present date.

It had been the intention to include in this report a history of the development of the Service, together with a full description of its present legal status, its functions, and personnel; and the preparation of a complete article had been begun when the exigencies caused by the outbreak of hostilities with Spain and the Service work in connection with yellow fever in the South demanded so close attention to more active duties that the historical summary was necessarily deferred until the next annual report, when it will be equally appropriate.

MEDICAL CORPS.

One board has been convened during the year for the examination of candidates for admission to the Marine-Hospital Service as assistant surgeons. The number of applications to appear before this board was 32. Thirty applicants presented themselves, of whom 5 attained the required standard.

APPOINTMENTS AND PROMOTIONS.

During the year 6 successful candidates were appointed to the grade of and commissioned assistant surgeons, and one passed assistant surgeon, after examination, was promoted and commissioned as surgeon.

RESIGNATION.

One assistant surgeon resigned his commission on June 22, 1898.

CASUALTIES.

During the year ended June 30, 1898, there have been two deaths among the medical officers of the Service. One of these deaths was, although occurring on October 2, 1897, the subject of mention at some length in my last annual report, as the circumstances of his demise, occurring while performing quarantine work and while barely recovered from a long illness, appeared to warrant notice at that time without waiting for the next issue of my annual report to you. I refer to P. A. Surg. W. D. Bratton, who died from injuries sustained by falling into the hold of a vessel which was undergoing disinfection at the quarantine station at Sabine Pass, Tex.

The second fatality was that of Asst. Surg. Emil Prochazka, who, on account of tuberculosis of the lungs, had been placed on waiting orders in the spring of 1897. His death occurred from this disease on April 1, 1898.

CIRCULAR LETTER ANNOUNCING THE DEATH OF ASST. SURG. EMIL PROCHAZKA.

TREASURY DEPARTMENT.

OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,

Washington, D. C., April 9, 1898.

To the Medical Officers of the United States Marine-Hospital Service:

It is my painful duty to announce to the officers of the Service the death of Asst. Surg. Emil Prochazka, which occurred on the 1st instant, at Silver City, N. Mex., from tuberculosis of the lungs.

Emil Prochazka was born in Manitowoc, Wis., April 9, 1864. His education began in the graded public schools of Manitowoc, where he graduated from the high school in 1880, subsequently entering the State University at Madison, where he pursued a special course for two years, devoting particular attention to higher mathematics, chemistry, and languages. He began the study of medicine in 1882 in the office of Dr. J. S. Pritchard at Manitowoc, entered Rush Medical College the following year, graduating in March, 1885. After graduation he entered private practice in Plymouth, Wis., and continued as a general practitioner in that place until 1890, which year he spent in Europe, doing special work at Prague, Vienna, and other cities. Returning to America in 1891, he resumed the practice of his profession in Beatrice, Nebr., leaving there in August, 1892, to enter the United States Indian Service as physician to the Indian agency at Nez Perces, Idaho.

He was commissioned as assistant surgeon in the Marine-Hospital Service April 19, 1893, and assigned to duty at the immigration depot, Ellis Island, N. Y., subsequently serving at United States marine hospitals at Stapleton, Louisville, and Cleveland until September, 1894, when he was assigned to duty at Detroit, Mich., remaining there until September, 1896. During this time, however, he served temporarily at Evansville, Cleveland, Charleston, Cairo, Buffalo, and Chicago. From this time until July 11, 1897, when he was placed on waiting orders, he served at Reedy Island and Delaware Breakwater quarantine stations.

In the fall of 1895 he became aware of the existence of a lung trouble, which in June, 1896, was definitely determined to be tuberculosis, but he manfully

continued on duty until the spring of 1897, when, being ordered to examination for promotion and feeling assured that he could not pass the required physical examination, he reported the fact to the Bureau, and was, after being physically examined, placed on waiting orders, as already mentioned. The last nine months of his life were spent at health resorts in Colorado and New Mexico.

Dr. Prochazka was unmarried, but leaves an aged father and devoted sister to mourn his loss.

Assistant Surgeon Prochazka was an officer of more than ordinary professional ability, having made excellent use of very superior advantages. Personally he was modest, reserved, and devoted to study and scientific research; honorable in all intercourse with his associates, by whom he was held in high esteem as a man and an officer.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

Of the two medical officers of the Service reported in my last annual report to be incapacitated from duty on account of tuberculosis one has died during the year, as above narrated, while the other, after returning to duty and so remaining for some months, has again been placed on waiting orders.

MEASURES FOR THE RELIEF OF THE LEGAL REPRESENTATIVES OF THE LATE ASST. SURG. JOHN W. BRANHAM.

Referring to the comments in my last annual report upon the above-named measure, it is gratifying to be enabled to report that during the last session of Congress the bill for the relief of the heirs of Assistant Surgeon Branham passed the House of Representatives and the act authorizing the payment to the heirs the sum of \$4,160—the amount of salary and allowances for an assistant surgeon for two years at the date of the death of Dr. Branham—was approved by the President June 15, 1898. The bill passed the Senate May 20, 1896.

The circumstances of his death, while in the performance of his duty, are set forth in your letter to the President of the United States, transmitting the bill to him, and stating your opinion that the measure was a meritorious one, of which the following is a copy:

TREASURY DEPARTMENT, *Washington, D. C., June 14, 1898.*

SIR: Referring to the accompanying act (H. R. 2425) sent to me for examination and with the request that I will state whether I know of any objection to its approval, I have the honor to report that on the 20th of July, 1893, the President of the United States, under section 3, national quarantine act, approved February 15, 1893, detailed Asst. Surg. John W. Branham, United States Marine-Hospital Service, to proceed at once to Brunswick, Ga., where the local quarantine authorities had failed to enforce the quarantine regulations of this Department, and to take charge of the quarantine. He immediately proceeded to Brunswick, and on the 20th of August, 1893, died of yellow fever contracted while in discharge of the duties assigned him. Dr. Branham left a widow with two infant children without means of support.

I am of the opinion that the act is a meritorious one and should become a law.

Respectfully, yours,

L. J. GAGE, *Secretary.*

The PRESIDENT OF THE UNITED STATES.

The following is the act in question:

AN ACT for the relief of the legal representatives of John W. Branham, late an assistant surgeon in the United States Marine-Hospital Service.

Whereas John W. Branham, late an assistant surgeon in the United States Marine-Hospital Service, contracted yellow fever while performing his duty as assistant surgeon in an infected city, and having died of yellow fever at his post of duty on the twentieth day of August, eighteen hundred and ninety-three: Therefore,

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That the Secretary of the Treasury be, and he is hereby, authorized and directed to pay, out of the money not otherwise appropriated, to the legal representatives of John W. Branham the sum of four thousand one hundred and sixty dollars, being the amount of salary and allowances for two years.

Approved, June 15, 1898.

OFFICERS DETAILED TO REPRESENT THE UNITED STATES MARINE-HOSPITAL SERVICE AT MEETINGS OF MEDICAL AND PUBLIC HEALTH ASSOCIATIONS.

Since the date of my last report the following details have been made:

Surg. J. M. Gassaway and P. A. Surg. J. J. Kinyoun to represent the Service at the meeting of the American Medical Association held at Denver, Colo., June 7-10, 1898.

Surg. Robert D. Murray and Surg. H. R. Carter to represent the Service at the quarantine conference held at Atlanta, Ga., April 12, 1898.

Surg. H. R. Carter to represent the Service at a quarantine conference held at New Orleans, La., April 8, 1898.

Surg. Charles E. Banks detailed by the President as delegate to the meeting at Madrid, Spain, of the Ninth International Congress of Hygiene and Demography, held April 10-17, 1898.

Surg. Charles E. Banks and P. A. Surg. J. J. Kinyoun to represent the Service at the meeting of the National Pure Food and Drug Congress held at Washington, D. C., March 1, 1898.

Surg. H. R. Carter, P. A. Surg. J. H. White, and P. A. Surg. A. C. Smith detailed to represent the Service at the quarantine convention of the South Atlantic and Gulf States held at Mobile, Ala., February 9, 10, and 11, 1898.

P. A. Surg. S. D. Brooks to represent the Service at the meeting of the Washington State Medical Society, May, 1898.

REPORT OF SURG. J. M. GASSAWAY ON THE FORTY-NINTH ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, HELD AT DENVER, COLO., JUNE 7-10, 1898.

OFFICE OF MEDICAL OFFICER IN COMMAND M. H. S.

Port of San Francisco, Cal., August 19, 1898.

SIR: I have the honor to report having attended the forty-ninth annual meeting of the American Medical Association at Denver, Colo., on June 7, 8, 9, 10, 1898. in obedience to detail conveyed by Bureau letter P. M. C., May 18, 1898. On the adjournment of the association I rejoined my station, arriving June 14, 1898.

Probably no previous meeting of the association has been presented with so rich a programme of scientific essays and so charming a variety of intellectual entertainment. The local faculty, the citizens, and the railroads vied with each other in banquets, receptions, and excursions, which, with the more than full registers of the several sections, embarrassed with its very richness the delegates, and undoubtedly drew many away from the more serious, if not more important, sessions of the association proper. As a result, the address on surgery by Dr. J. B. Murphy, of Chicago, Ill., to be read in the open meeting, although of most tremendous importance as an entirely new view in the treatment of tuberculosis, was given but a half hour of time, and the distinguished author was able only to read the heads of his essay. It is, fortunately, printed in full in the journal of the association. In the sections many of the most promising papers were read only by title, a physical impossibility to crowd them into the time allowed.

At the second general session, June 8, Dr. W. H. Sanders, State health officer of Alabama, offered a series of resolutions in regard to the public health, as follows:

[Resolutions submitted to the American Medical Association at the Denver meeting, June 8, 1898, by W. H. Sanders, M. D., health officer of Alabama.]

Whereas the protection of the public health is one of the duties and functions of all well organized and progressive governments: Therefore, be it

Resolved (1), That it is the sense of this body that a public-health system, correct in principle, complete in detail, and applicable alike to every part of the country should, at the earliest time possible, be created and put into vigorous operation.

Resolved (2), That in order for such a system to be constitutional, coherent, and permanent, it should logically conform to the genius and plan of our concentric systems of government—that is to say, its roots should be deeply planted among the people, the recognized source of governmental power under our Constitution, and its branches should reach up through and be sustained by every political division of our State governments to one central and resourceful power, the nation.

Resolved (3), That to lay the foundations for such a system the States should formulate their policies of public health with sufficient uniformity as to render them susceptible of being united into one symmetrical and harmonious whole, and to lead up to and terminate in one central and cooperative head, namely, the General Government acting through a bureau of public health.

Resolved (4), That while the officials for actively conducting a public health system should be of local origin and authority, and therefore directly and proximately responsible to the people, the States and the nation should cooperate with the local authorities in furnishing the expert skill and financial aid necessary for suppressing dangerous, contagious, and epidemic diseases when they appear in any given locality, and for preventing their spread from one part of a State to another part of the same State, or from one State to another State.

Resolved (5), That the principles herein announced should apply to the theory and practice of quarantine, which, although an important part and function of a public health system, is not the only one of its numerous and beneficent powers. To divorce the exercise of quarantine power from a public health system and to confer it upon a separate organization which derives its existence and vitality from the General Government, and not from the people of the States, would be to emasculate and ultimately to destroy said system, as well as to overthrow one of the most sacred and valued principles upon which our Government is founded.

Resolved (6), That an earnest appeal is hereby made to the Congress of the United States to recognize the principles herein proclaimed as constitutional and unassailable and as in thorough accord with the generic truths out of which our political fabric has been evolved."

These resolutions having been read by the author, were referred, under the rule, to the business (or executive) committee. Dr. Sanders, however, moved their adoption as an expression of the opinion of the association on the matters treated of, which was, according to the official report of the proceedings, "seconded and carried." It would appear, however, from the same official report, that Dr. Sanders asked, on the third day's session, as to what disposition had been made of his resolutions. Thereupon, on motion, the resolutions were (same official report) referred to the business committee, with power to act.

The business committee, however, on examining them, concluded that it was not competent for that committee to take any action in the matter, and so they were laid on the table by that committee.

It will be observed that the official report of the business committee's report, June 9, 1898, does not speak of these resolutions. It is difficult to know whether they are approved by the association or not.

It is proper to state here that through some misadventence the original of these resolutions was withdrawn from the secretary's table and no copy of them could be had until after considerable correspondence, which brought me simultaneously within the past six days copies from Dr. Sanders himself and from the chairman of the executive committee.

On the evening of the second or the morning of third day the report of the special committee on department of public health, neatly printed in small pamphlet form, was distributed to the association. At the proper time during the third day's session the chairman of that committee, Dr. U. O. B. Wingate, of Milwaukee, Wis., began its reading, and after some minutes, possibly one-quarter of it having been read, the further reading was dispensed with, and some discussion ensued which terminated in a motion that the report, with the resolutions, be adopted, except that the clause appropriating \$1,000 be referred to the board of trustees, with power to act. This motion was promptly seconded, and although this reporter, with some other members of the association, attempted vigorously to get the floor to debate upon or otherwise express their opinions on the subject, the ayes and noes were immediately taken and the report and the resolutions declared adopted.

This somewhat unusual procedure (that is, of not referring the report to the appropriate committee) was doubtless due to the statement made on the floor of the association that this matter had been seven years in preparation by its committee and that it should not be referred, like other similar matters, to the business committee, because that committee has no business with it.

This meeting was next to the largest (Philadelphia, 1897) yet had by the association, and many of the members were much disappointed at the absence of the president, Surg. Gen. George M. Sternberg, U. S. A., detained by pressing official business.

Respectfully, yours,

JAMES M. GASSAWAY,
Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT OF SURG. CHARLES E. BANKS, DELEGATE TO THE NINTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY, HELD AT MADRID, APRIL 10-17, 1898.

SIR: I have the honor to submit the following report of services rendered in connection with my detail as delegate, on the part of the Department, to represent the Government at the International Congress of Hygiene and Demography, held at Madrid, Spain, April 10 to 17, 1898.

As a preliminary to the subject-matter of the report, I desire to refer to the date of my orders, March 15, 1898, which, as will be seen by a reference to international

events then pending, brought my contemplated trip to the very brink of war between this Government and Spain. Indeed, after the receipt of the order the existing difficulties between the two nations had reached such a point that I had practically abandoned the expectation of going. An apparent improvement in the strained relations a few days prior to the date of my departure, however, induced you to approve my attempting to fulfill my mission, and I hastily started for New York to take passage by steamer on the 26th of March.

While I was crossing the Atlantic the long-expected report of the board of inquiry into the disaster to the U. S. S. *Maine* was made, and upon my arrival in London the excitement had intensified and the relations between the two countries had become more strained. Acting upon your verbal instructions after my arrival in London to consult with our diplomatic representatives abroad as to the situation and the desirability of proceeding to Madrid, I did so, and was advised from day to day to await developments. I endeavored to secure by letter and telegraph advices from our legation at Madrid, both before and after arrival in London, but did not receive any reply. I occupied such time as I could, while awaiting events to transpire, in carrying out the directions of your letter of March 16 with respect to an examination of the hospital ambulance systems abroad and the hospital equipments of all hospitals in the course of my journey, a report of which is made in a separate communication.

I proceeded to Paris on the 8th of April, still uncertain as to the probability of reaching my destination, arriving there on the night of the same day, with the expectation of consulting our ambassador in Paris. In consequence of the legal holidays which intervened—Easter Sunday and Easter Monday—and his absence from the city I was unable to see him until the 12th instant, during which time the President's message to Congress had been delivered, asking authority to intervene, and the rupture of relations between the two countries was practically settled. The family of our minister at Madrid had left that city in anticipation of the immediate severance of diplomatic relations, and it was currently reported, though definite information was unobtainable at our embassy in Paris, that our minister was also on the point of leaving or had left. I determined, however, on the 12th instant to proceed and ascertain by personal observation the chances of accomplishing my mission. I reached Madrid on the 13th, at midnight, and found the congress in session the next day. After enrolling myself as a delegate I was presented to the secretary of the congress and made known my official standing. I was not surprised, however, at the unmistakable character of the greeting accorded me, nor could I take exception to its pronounced formality, considering the situation. The prevailing sentiment was of unconcealed hostility to the United States and the tone of the surroundings was, therefore, anything but pleasant. This is not remarked as a complaint, but as the inevitable condition of impending hostilities and the natural sympathy of European delegates with a neighboring people—a sympathy that was openly avowed by delegates from Republics on this hemisphere.

The attendance was stated to be about 1,500 members, representing twenty-six countries, of which 1,350 were from Spain, 110 from France, 50 from Great Britain, and 48 from Germany. Of the latter representation it should be stated that 22 were "official" delegates from the Imperial Government, as showing how other nations recognize such events. In the "Lista Provisional de Delegados" 5 were accredited to the United States—1 from the Army, 1 from the Marine-Hospital Service, and 3 others from civil life. It is not known that these latter attended, but I met, in addition to the Army representative, a medical officer of the Navy, whose name did not appear on the official list.

Of noted men in attendance, I might mention Pagliani, of Rome; Brouardel, of Paris; Mahmoud Pasha, of Constantinople; Surgeon-General MacPherson, of London; Professors Behring, Loeffler, and Liebrich, of Germany.

The management of the congress was under the nominal control of the ministro de la gobernacion (interior), and all the social functions and excursions were managed by government officials. As this was the week in which the President of the United States had delivered his message to Congress, and that body was on the eve of passing resolutions which meant war, it can be readily seen that the Spanish Government officials had but little time to enter into the spirit of the literary and social proceedings of the congress of hygiene. The whole atmosphere was that of restraint. It was the sole topic of conversation, and the newspapers were filled with the most inflammatory articles, and the dead walls on the streets placarded with appeals to Spanish patriotism and pride and caricatures of the "Yankee pig."

The secretary of the congress, Senor Dr. D. Amalio Gimeno, had been engaged in a political campaign as candidate for senator of the Cortes from the province of Valencia, and it is not difficult to see how he was unable successfully to carry the innumerable details of the congress and at the same time give consideration to the greater political matter which was then agitating the Spanish Government. During it all, however, there was a courageous attempt to ignore the unpleasantness of the situation, and most of the social functions were carried out with an attention to the entertainment of the guests which could but excite the admiration of those who knew the difficulties under which the officials labored. Many of the excursions were postponed from day to day and at last fell through, owing to the "political situation," which was the accepted explanation of all deficiencies.

The social functions consisted of a bull fight on Easter Sunday, a reception by the Queen Regent at the Palacio Real, a performance at the Royal Opera House, another at the Opera House Alphonso XIII, a reception by the civil governor of Madrid at the Ayuntamiento, closing with a bull fight at the Plaza del Toros on the 17th (Sunday). In addition to these there were advertised excursions to Toledo, the Escorial, and Grenada, but, owing to the difficulty of obtaining information and the frequent postponements, but few attended. The American legation was so much occupied with the existing political situation, living from day to day at the official residence in "marching order," that it could not give any time or attention to social courtesies to the official representatives of our Government, and under the circumstances none were expected. For the same reason the wearing of uniforms was omitted by the delegates from the United States.

From the above statements it will be seen that in consequence of the unfortunate time in which the congress was held the fulfillment of my detail was accomplished under unpleasant circumstances.

Sessions of the congress were held in the Palacio de la Biblioteca y Museos Nacionales, a fine building on the Paseo de Recoletos. It is devoted to the exhibition of literary and art collections, but owing to its internal arrangements was quite unsuited to the purposes of a large assembly which intended to devote its time to scientific discussions. Rooms assigned to different sections opened into each other, and were necessarily passageways to other rooms, so that there was the continual noise from morning till night of delegates passing to and from sections, making careful attention to the proceedings almost impossible. The ground floor was used for the display of machinery, paraphernalia, and articles employed in the conservation of the public health. A large part of the display came from the Spanish peninsula, and consisted for the most part of articles intended for military and naval use, water filters, models of municipal sewerage systems, and hospital construction. It was a creditable exhibit. France was represented by surgical appliances, disinfecting stoves, instruments of precision; Germany by chemical products, disinfectants, and disinfecting apparatus, and England by prepared foods and lavatory and sanitary appliances.

The congress was divided into thirteen working sections, and it was the opinion of those who had attended previous meetings that the acknowledged mistakes of administration at Berlin and Budapest were repeated by this dissipation of the working strength of the members by an excess of specialization. The bacteriological section attracted the greatest interest and attendance. Dr. Behring read a paper on "Tuberculosis antitoxin;" Dr. Janowsky, of Warsaw, on a "Uniform standard for therapeutic serums," and Dr. Durham on the "Micrococcus of Malta fever." This section passed a resolve in favor of an international bacteriological commission, which was adopted by the general congress. The section of preventive medicine discussed vaccination and revaccination and serum therapy of cowpox. The section on demography considered the subject of climatology of tuberculosis, the sanitation of cemeteries, and child labor. The section on school hygiene held animated discussions, amusing to one accustomed to the phlegmatic debates of the Anglo-Saxon, relative to education of children. The ardor of the Latin temperament in manner and expression upon abstruse subjects was extravagantly expended upon a proposition of an official of the public instruction board of Spain that children should not have books for study, but be didactically instructed until 10 or 12 years of age.

The closing session was held in the great hall of the Central University, and consisted of the adoption, without discussion, and probably without much understanding upon the part of the delegates, of the resolutions prepared by the several sections. Out of a large attendance of many hundred but a few could hear the announcements, and but a few voted upon the propositions. Complimentary speeches followed from the representatives of the various nations, and adjournment was taken, to meet in Paris, France, for the next congress in 1900.

As the Congress of the United States had practically agreed to the passage of the resolutions granting the President power to intervene on Monday, the 18th, and having no further business to detain me, I left that day, and our minister was given his passports on the 20th.

I proceeded to Paris and remained three days in the fulfillment of your order respecting the inspection of hospitals, equipment of same, and the municipal ambulance system, and thence to London, Leeds, and Liverpool on the same duty, and sailed for New York on the 4th of May.

REPORT OF SURG. CHARLES E. BANKS ON HOSPITAL EQUIPMENT, WARD FURNITURE, AMBULANCES, ETC., IN CERTAIN HOSPITALS OF SPAIN, FRANCE, AND ENGLAND.

WASHINGTON, D. C., *September 10, 1898.*

SIR: In accordance with instructions contained in your letter of March 16, 1898, directing me to visit, "while in Europe, such civil and military hospitals as may conveniently be seen, for the purpose of inspecting hospital equipments and modern improvements in ward furniture and the ambulances in use," I have the honor to submit, as therein directed, a written report of my investigations for the information of your office.

The duty involved in the above-named order was contemplated in connection with my detail as delegate to represent this Service at the Ninth International Congress of Hygiene and Demography, held at Madrid, Spain, April 10-17, 1898, and the opportunity afforded during my travel to and from Madrid was made available as far as possible in fulfillment of the plan. I did not alter the usual route of travel for the purpose of extending my journey in this respect, but confined myself to the large cities of Madrid, Paris, Southampton, London, Leeds, and Liverpool, with the exception of the towns of Greenwich and Chatham, England. I visited these two last-named points because at them are located the famous seamen's hospital (lately known as the "Dreadnought") and the branch

of it in the latter-named place. I was especially gratified at this opportunity to study and examine these hospitals, their equipments, and the ambulance systems of those parts of Europe, as it was in direct line with my official duties at the Bureau for the past three years as acting medical purveyor in attending to the supply of our own hospitals with similar equipments.

In the beginning I might say that I was disappointed, generally speaking, with the comparison of the hospitals of those places and the modern establishments in our American cities and our own hospitals. With some exceptions, which I shall refer to at length, I did not see any institution which equaled the modern municipal hospitals of our large cities, and, indeed, of many of our small cities as well—either in construction, equipment, or ambulance system. I certainly saw none that surpassed them, one only excepted, and my final impression of the entire examination was one of gratification at our national progress in these matters. Judged from the standpoint of aseptic environment, ward equipments, furniture, trained nurses, and ambulance systems, the general run of hospitals that I saw have much to learn from the new world. I shall, therefore, not specifically mention the hospitals which I regarded as of a standard inferior to our own, viewing them from the modern attributes of cleanliness and aseptic equipment, because many of them are, as is well known, old structures, built before the days of antiseptis, and from their internal arrangements not specially fitted for such transformation as our own ideas of construction require, except at great expense and radical rearrangement. In Paris this is particularly true of such hospitals as La Pitié, St. Louis, Necker, Charité, and even the celebrated Hotel Dieu, which in its rebuilt form is about a quarter of a century old. These remarks apply, of course, to the buildings proper, and not to their management.

England.—I visited hospitals in Southampton, London, Leeds, Liverpool, Greenwich, and Chatham—fourteen in number. Many of them are extensive institutions, with considerable pretensions to architectural design, but the consumption of soft coal destroys all exterior beauty in the large cities of England. Most of these hospitals are familiar to medical men, and their construction and plans are well known. I found them as a rule indifferently equipped with modern iron and glass ward furniture and surgical operating furniture, now seen in all our own hospitals; or if some was to be found it was only a partial equipment. In one case I saw a modern iron and glass operating table alone; all the rest of the room was fitted with the old-style articles. The floor and walls were unregenerated. This table was shown to me with evident satisfaction. The Royal Infirmary, Liverpool, answered more nearly to our ideas of a model than any English institution I visited. With the splendid basis of stone, brick, iron, and tile, it lends itself easily to the requirements of a modern hospital in its rooms, wards, lavatories, etc., and the management liberally met the conditions imposed by the canons of asepsis. It is one of the most, if not the most, elaborate and elegant institution of its kind in England.

In conversation with a dealer in aseptic operating-room furniture in London, I was told that there was very little demand for it in England, and one superintendent of a hospital characterized the use of iron and glass surgical equipment as “fuss and feathers.”

Of ambulances and ambulance systems I saw none worthy of the name, or anything that could compare with our municipal and Government systems. As a matter of fact, the hospital authorities took the ground that it is a municipal duty to bring the sick to the hospitals, and not, as one superintendent expressed it to me, the business of the hospital “to be running like mad through the streets, clanging a gong as if going to a fire, and advertising your institution with a flaming sign on the side of the wagon.” The injured, picked up in the streets, are carried to hospitals in any sort of a public conveyance, of which there are innumer-

able quantities in all large towns, or, perhaps, in the curious two-wheeled hand-carts with a canvas bonnet top, used by the police to transport inebriated persons from the street to the police station. Those with whom I talked on the subject maintained that no harm results from the slight delays which might be due to an absence of ambulances at each hospital, but they contend that by the use of such conveyances as are at hand the victims of accidents or disease on the streets reach the hospital more quickly by that method. It was further stated that the constabulary are instructed in "first aid to the injured," and that "all the hospitals were so fully occupied that they did not need to drum up trade."

As above stated, I made a special visit to the seamen's hospital at Greenwich and its branch at Chatham. This hospital in a sense represents a character of work similar to our own marine hospitals, although it is not a government institution. In the last century a hospital for the care of sick and disabled seamen was erected at Greenwich, in accordance with a provision of an act of Parliament, the history and character of which I shall make the subject of a special article in connection with the centennial of the establishment of this Service, and I shall now only refer to it incidentally in connection with my visit. Its successor still exists in Greenwich. The seamen's hospital known as the "Dreadnought" has no connection with the older institution, though it is situated contiguous to it. The seamen's hospital is maintained as a private institution, dependent on public charity, for the benefit of seamen, sick or disabled, both foreign and domestic. No charge is made for such patients, and from the character of the commerce that comes up the Thames it will readily be seen that the nationalities represented by the patients are many and picturesque. I saw sick seamen from all the continents representing the different races of men. This hospital maintains a branch lower down the river near the Chatham dockyards. These institutions are old-style buildings, and, beyond their interest in connection with the work carried on in them similar to our own, merit no special remark.

France.—I visited seven hospitals in Paris—Hôtel Dieu, La Pitié, La Charité, St. Louis, Lariboisière, Necker, and Boncicaut. The general character of the Paris hospitals is a part of every medical man's education, and it will not be necessary to undertake a description of them except in the case of the magnificent Boncicaut Hospital, lately completed. La Pitié I found in a state of reconstruction. The other hospitals are old, and present no features of equipment worthy of adoption. At the Hotel Dieu a partial surgical outfit of iron and glass furniture was observed, but no attempt to improve its environment.

The Boncicaut is the latest addition to Paris hospitals, and is the gift of the late widow of the proprietor of the celebrated Bon Marché, in memory of her husband and his business enterprise. It is on the south side of the Seine, occupying nearly a square, and constructed on the pavilion plan, with a large central court containing a chapel and statue of Madame Boncicaut and ornamental garden. All the most modern ideas of hospital construction are here engrafted into the ensemble, and after one has walked through the great establishment with its mosaic floors, tiled walls, and seen its elaborate preparations for rendering the structure and its contents aseptic, the acme of design and fulfillment seems to have been reached; and yet it can not be said to compass more than the standards observed in the latest additions to our New York city hospitals, and it only demands unusual notice because it is up to our own best level, and so much superior to anything else in Paris. The equipment was in keeping with the building—every attention being paid to the cleaning of the floors and walls. I noticed the use of hospital suits and a minimum of paraphernalia in the wards. It is a general hospital for both sexes.

There is an approach to an ambulance system in Paris, and I saw one of the vehicles used as such, but it is an institutional system—only transporting patients

from one hospital to another for special forms of continued treatment. The wagon was an unwieldy closed van, weighing $1\frac{1}{2}$ tons, resembling the "Black Maria" in appearance, although it was rubber-tired and had some modern conveniences inside. It is the duty of the police to send persons suffering from accidents or disease, found in the streets, to the hospital in any convenient public vehicle which may be first at hand. The wagon referred to is never used for that purpose. I was informed that the authorities are experimenting with an aluminum ambulance, to secure lightness.

Spain.—As I was considerably occupied during my stay in Madrid in attendance on the sessions of the congress, and owing to the difficulty of getting accurate information as to the visits to various institutions planned by the committee of arrangements, I was obliged to make such inspections as I could alone. The principal and largest hospital in Madrid is the new military hospital at Carabanchel. It is on the site of a medical university established by Philip V, which was partially built and left in ruins. In 1873 the sanitary military corps pressed their demand for a new military hospital for the garrison of Madrid and the soldiers of the Spanish army in general. The site is a commanding one on the slope of the hill of Almadovar in the municipality of Carabanchel. The extent of the grounds is 84,123 square meters, which does not include some adjacent lands not yet acquired, and which will be devoted to buildings constructed for epidemic diseases. This new military hospital is a magnificent set of buildings, constructed upon the most liberal plan, based upon the most advanced ideas of construction and equipment. It consists of twenty-four buildings or isolated pavilions, four of which are intended for the treatment of internal diseases, two for surgical operations, three for infectious diseases, and the remainder for the medical service proper and quarters for the officials, officers and subalterns, patients and employees. Included in this last class is a building known as the bath house, which is something more than its name implies, for besides the necessary places for the application of hydrotherapy in its various forms, it has apartments for aërotherapy and electrotherapy, with all the modern appurtenances for carrying out same. It also contains a swimming pool for the use and exercise of officers and soldiers. The hospital is practically independent in respect to heating and lighting, having its own plant for each, besides ice-manufacturing plants. To such an extent has the separation of the various classes of buildings been carried to prevent possible contamination, I might mention that the necropsy building has a separate ice plant of its own. The system of ventilation which will be finally adopted is that of the Belgian engineer, M. M. Putzey, with some modifications devised by the Spanish engineers. A provisional system of ventilation, the Bayle system, with air pumps, is now in use. The buildings are to be heated by a system of indirect radiation. The buildings are constructed of iron and stone and glass, and would seem to be incapable of harboring infection for any length of time, if properly administered. The entire hospital is not yet completed, but even in its present state it is a remarkable and altogether creditable institution. It was a wonder to me how provision was made for financing this expensive military hospital during a time when the Spanish nation was engaged in prosecuting two wars and, according to common report, with her fiscal arrangements very unsatisfactory. I also visited the institute of Sr. Ch. Rubio, an institution for the treatment of childrens' diseases, built at his own private expense within the last few years. This also answers every requirement of modern hospital construction and equipment. As far as I could learn there was no ambulance system, as such, at the hospitals at Madrid, excepting such as was attached to the military hospital as a part of the army system.

Respectfully, yours,

CHAS. E. BANKS.

Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT OF SURG. S. D. BROOKS ON THE MEETING OF THE WASHINGTON STATE MEDICAL SOCIETY.

OFFICE OF MEDICAL OFFICER IN COMMAND M. H. S.,
 PORT TOWNSEND QUARANTINE,
Port Townsend, Wash., May 13, 1898.

SIR: I have the honor to report that I attended the annual meeting of the Washington State Medical Society at Seattle, as directed by Bureau letter of the 18th ultimo (P. M. C.), and returned to duty this morning.

The meeting was quite successfully carried out. At the request of the President, I presented a paper on the necessities for quarantine on the Pacific coast, but practically no discussion was drawn out.

Respectfully, yours,

S. D. BROOKS,
Past Assistant Surgeon, M. H. S.

SURGEON-GENERAL, MARINE-HOSPITAL SERVICE.

 REVISION OF THE REGULATIONS.

The revision of the regulations mentioned in my last report, made necessary by the increase in the scope of the Service and the consequent inadequateness of the regulations issued in 1889 has been completed.

The new regulations, much enlarged, comprising some 698 paragraphs, and suited, it is hoped, for the proper conduct of the Service in all its details, were submitted to you for approval, and after such was obtained, received the approval of the President on December 1, 1897, and were immediately printed and promulgated.

INFORMATION FOR THOSE DESIRING TO ENTER THE MEDICAL CORPS OF THE UNITED STATES MARINE-HOSPITAL SERVICE.

The revision of the Service regulations made necessary the issue of the following Department circular, application blank, and specimen set of examination questions. These are now issued to all making application for permission to present themselves before an examining board of surgeons for admission to the corps as assistant surgeons:

CIRCULAR.

TREASURY DEPARTMENT,
 OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., February 11, 1898.

The following extract from the Revised Regulations of the Marine-Hospital Service is hereby published for the information of candidates for appointment into that Service.

* * * * *

The following is the act governing appointments:

“Medical officers of the Marine-Hospital Service of the United States shall hereafter be appointed by the President, by and with the advice and consent of the Senate; and no person shall be so appointed until after passing a satisfactory examination in the several branches of medicine, surgery, and hygiene before a board of medical officers of the said Service. Said examination shall be conducted according to rules prepared by the Supervising Surgeon-General, and approved by the Secretary of the Treasury and the President.

"SEC. 2. That original appointments in the Service shall only be made to the rank of assistant surgeon; and no officer shall be promoted to the rank of passed assistant surgeon until after four years' service and a second examination as aforesaid; and no passed assistant shall be promoted to be surgeon until after due examination: *Provided*, That nothing in this act shall be so construed as to affect the rank or promotion of any officer originally appointed before the adoption of the regulations of eighteen hundred and seventy-nine; and the President is authorized to nominate for confirmation the officers in the Service on the date of the passage of this act."

* * * * *

18. Graduates of medicine desirous of undergoing examination for the position of assistant surgeon in the Marine-Hospital Service of the United States must make an application, addressed to the Supervising Surgeon-General, in their own handwriting, requesting permission to appear before the board of examiners. Applicants for examination should state their age, date, and place of birth, present legal residence, and whether they are citizens of the United States, and name of medical school and college of which they are graduates, and furnish testimonials from at least two persons as to their professional and moral character.

19. Any applicant for appointment who shall submit false testimonials as to his character, or who shall give a false certificate of age, or make any false statement in his application, or to the board of examiners, shall be disqualified for appointment; or, if appointed before such false statement is discovered, shall be dismissed from the Service.

20. No person will be appointed as assistant surgeon whose age is less than 21 or more than 30 years, and, as a preliminary to a recommendation for appointment, the applicant must have been graduated in medicine at some respectable medical college, and must pass a satisfactory physical, academic, and professional examination before a board of commissioned officers.

21. Commissioned officers will not be appointed to any particular station, but to the general service. They will be subject to change of station, as the exigencies of the Service may require, and shall serve in any part of the United States or wherever assigned to duty.

22. A board of commissioned officers will be convened from time to time by the Supervising Surgeon-General for the purpose of examining applicants for appointment. This board shall consist of three or more commissioned officers, of whom the senior shall be chairman and the junior recorder of the board.

23. The board of examiners will make a true report on the merit roll (Form 1936) of the actual and relative standing of applicants and transmit the examination papers, with their recommendation in each case, to the Secretary of the Treasury, through the Supervising Surgeon-General. The maximum mark in any one branch of the examination shall be 100, and no applicant will be recommended for appointment who fails to receive an average grade of 80 in the ratings on the topics named in paragraphs 26 and 28.

24. All academic and professional examinations for appointment shall be conducted by said board of medical officers, and the order of examination shall be: (1) Physical; (2) academic; (3) professional; (4) clinical; (5) personal (including general aptitude and moral fitness).

25. The physical examination will be made according to the rules elsewhere given; the examiners must pay special attention to conditions that may impair efficiency or cause early placing on "waiting orders," such as hereditary diseases, overstrain of nervous system, impaired vitality from excesses of any kind. Applicants should be required to give an explicit statement of any severe illness or injury, and the cause of death of near relatives, and certify that they believe themselves free from any ailment—mental or physical—or defect which would disqualify them for active service in any climate.

26. The board will examine the applicant orally as to his proficiency in general literature, language, history, and geography of the United States in particular, and such branches of general science as they may in their discretion think pertinent.

27. The written examinations of applicants for appointment will begin with a short autobiography of applicant, in which he will concisely state: Whether married or single; the date and place of his birth; the school, institution, or college at which he received his general education; the several branches studied, including his knowledge of general literature and of the ancient and modern languages; the exact title of the medical school or schools at which he received instruction, and the date of his graduation; the name and place of residence of his preceptor and the time when he commenced the study of medicine; also the titles of the text-books studied on chemistry, anatomy, physiology, histology, materia medica, pharmacy, therapeutics, theory and practice of medicine, principles and practice of surgery, medical jurisprudence, toxicology, obstetrics, hygiene, biology, pathology, bacteriology, and physics; the opportunities he has had of engaging in the practice of medicine, surgery, and obstetrics, or of receiving clinical instruction; and whether he has been a resident physician or interne in a civil or military hospital; and the number of cadavers or parts of cadavers he has dissected while at college or elsewhere. The candidate will append to this statement his name in full, post-office address, and his local address at the date of the examination.

28. The remainder of the written examination of applicants for appointment will consist of questions on: (1) Anatomy; (2) physiology; (3) chemistry; (4) materia medica and therapeutics; (5) practice of medicine; (6) practice of surgery; (7) obstetrics and diseases of women; (8) hygiene; (9) pathology and bacteriology; (10) reports on selected cases at a hospital. These cases will be selected by the examiners so as to give at least two—one medical and one surgical case—to each applicant.

29. This examination will further consist of such inquiries as may tend to develop the general aptitude of the person for the special duties required of a commissioned officer in the Service and to show his moral qualifications for the position of trust and responsibility which he will assume when appointed.

30. When practicable, applicants for appointment will be required to perform such surgical operations on the cadaver as may be directed by the examiners.

31. The passing of an examination will not be considered as giving assurance of appointment, as, in case there should be more successful candidates than vacancies, the Secretary of the Treasury will select for recommendation to the President those of the highest attainments, as shown by their relative standing on the roll reported by the board of examiners.

32. No qualified applicant will be eligible for appointment more than one year. If not appointed within that time he may be reexamined, unless he has passed the limit of age, as provided in paragraph 20, when, if successful, he will take position with the class last examined.

33. An applicant for appointment failing at one examination may be allowed a second examination after one year if he has not passed the limit of age, as provided in paragraph 20, but he shall not be allowed a third examination.

34. When an applicant for appointment has shown by his papers on the four branches—anatomy, physiology, chemistry, and materia medica—during the progress of his examination that he is deficient to such an extent that it would be impossible for him to reach the required general average in all branches, the board of examiners may, in its discretion, reject this applicant without further examination.

35. Before the applicant has demonstrated his inability to pass the examination the board, in its discretion, may accord the applicant privilege to withdraw, but in this event the applicant shall not be eligible for another examination for a period of one year.

EXAMINATION OF CANDIDATES FOR PROMOTION.

36. A board of commissioned officers will be convened from time to time by the Supervising Surgeon-General for the purpose of examining candidates for promotion. This board shall consist of three commissioned officers, of whom the senior shall be chairman and the junior recorder of the board. The board will make a true report on the merit roll (Form 1936) of the actual and relative standing of the candidates for promotion, and transmit the examination papers, with its recommendations, to the Secretary of the Treasury, through the Supervising Surgeon-General.

37. Examinations for promotion will be made chiefly in writing, but may be supplemented, in the discretion of the examiners, by an oral examination on any subject connected with the official and professional duties of the officer. Candidates for promotion, of whatever rank, must show themselves proficient in all the regulations governing the Service. The examiners will also examine carefully the record of the service of the officer as furnished from the Bureau, and shall give due consideration thereto in making their recommendations. No officer will be recommended for promotion who shall be found physically disqualified.

40. When an officer fails to pass the physical examination required for promotion, the board of examiners shall report in detail the physical condition of said candidate, and if it shall appear that his condition is the result of irregular or dissipated habits, the case shall be reported as requiring investigation by a board convened in accordance with paragraph 248. If it is the result of disease or disability contracted in the line of duty, he shall be recommended for "waiting orders" or special duty of a light character.

42. Assistant surgeons, at the expiration of five years' service, shall be entitled to an examination for promotion to the grade of passed assistant surgeon, as hereinafter specified, and they will be ordered to appear before a board of commissioned officers for this purpose. Failing to pass the first examination, they shall be allowed a second examination, but not until after the expiration of one year, and shall be ordered to appear for said examination as soon after the expiration of the year as practicable.

44. An assistant surgeon, in order to be recommended for promotion, must obtain an average mark of 80 per cent and not less than 70 per cent in any of the following branches: (1) Anatomy; (2) physiology; (3) chemistry; (4) materia medica and therapeutics; (5) practice of medicine; (6) practice of surgery; (7) obstetrics and diseases of women; (8) hygiene; (9) pathology and bacteriology. The examination to be written, and he must satisfy the board that he has been diligent in keeping himself informed of the progress and improvements in the practice of his profession since his appointment into the Service, and, in addition to the above, he must pass a physical examination.

47. A vacancy in the grade of surgeon will be filled by promotion from among the passed assistant surgeons who shall be eligible to promotion to the grade of surgeon in the order of seniority, but such officer will not be promoted until he shall have passed a satisfactory professional examination in writing in the practice of medicine, surgery, hygiene, hospital and quarantine management, and regulations of the Service, in addition to a physical examination. He shall

be required to make an average marking of 80 per cent on the above-mentioned subjects.

Passed assistant surgeons who are eligible for promotion to the grade of surgeon shall be ordered to appear before a board of commissioned officers for that purpose. Failing to pass this first examination, they shall be allowed a second examination after the expiration of one year, and shall be ordered to appear for said examination as soon thereafter as practicable.

* * * * *

49. When an officer reports himself or is reported unfit to perform his official duties by reason of disease, injury, or age, he shall be ordered by the Supervising Surgeon-General, if in his opinion it is necessary, to appear before a board of commissioned officers, who shall thoroughly examine him, and if it shall appear that the disability is the result of irregular or dissipated habits, the case shall be reported as requiring investigation by a board convened in accordance with paragraph 248. If it be the result of disability in the line of duty, the board shall recommend him for "waiting orders" or for special duty of a light character.

* * * * *

70. The compensation of commissioned officers, when not provided for by statute, shall be fixed at a uniform annual rate for each rank as follows, viz: Surgeons shall receive \$2,500 per annum; passed assistant surgeons shall receive \$2,000 per annum, and assistant surgeons shall receive \$1,600 per annum; and after five years' service an additional compensation of 10 per cent on the annual salary for each five years' service shall be allowed commissioned officers above the rank of assistant surgeon, but the maximum rate shall in no case exceed 40 per cent. Said officers placed on "waiting orders" for a period longer than two months shall receive 75 per cent of the pay of their respective ranks while so placed.

* * * * *

93. When a commissioned officer is serving at a station on active duty where there are no quarters belonging to the Service, he shall receive commutation for quarters at the following monthly rate, allowed medical officers of the Army of the same relative rank, viz: For surgeons, for 4 rooms, fuel, and lights, commutation, \$50 a month; for passed assistant surgeons, for 3 rooms, fuel, and lights, \$40 a month; and for assistant surgeons, for 2 rooms, fuel, and lights, \$30 a month. When on duty on board a revenue cutter or quarantine vessel or on waiting orders officers will not be allowed commutation.

* * * * *

On appointment, the young officers, as a rule, are first assigned to duty at one of the large marine hospitals, as at Boston, New York, Baltimore, New Orleans, Chicago, or San Francisco. Officers traveling under orders are allowed actual expenses. Boards of examiners are usually called once a year, and appointments are not influenced by politics.

WALTER WYMAN,

Supervising Surgeon-General M. H. S.

Approved:

O. L. SPAULDING,

Acting Secretary.

APPLICATION FOR EXAMINATION.

SIR: I have the honor to make application for examination for appointment as assistant surgeon in the United States Marine-Hospital Service. I was born at _____, on _____, in _____, and graduated at _____, in the year _____. I am a legal resident of the State of _____.

(town or city) (county) (State) (month) (day) (year) (name of medical school or college of which candidate is a graduate) (year) (State)

I inclose two testimonials as to my professional and moral character.

Respectfully, yours,

SUPERVISING SURGEON-GENERAL, M. H. S.,
Washington, D. C.

SPECIMEN LIST OF WRITTEN QUESTIONS USED IN AN EXAMINATION FOR ADMISSION TO THE GRADE OF ASSISTANT SURGEON, MARINE-HOSPITAL SERVICE.

Questions on preliminary education and collateral branches are included in the oral examination.

Hospital cases are given for examination and report.

ANATOMY.

1. What nerves are distributed to the eye and eyelid, and what is the distribution of each?
2. Name the branches of the internal iliac artery, and give the origin of the obturator artery and the relation it bears to the femoral ring.
3. Describe the middle ear and the Eustachian tube.
4. Describe Scarpa's triangle, and name the important structures contained therein.
5. Describe the temporo-maxillary articulation and its relations.

PHYSIOLOGY.

1. What is volition as applied to locomotion? Give the route it travels to develop motion.
2. Explain arterial blood tension and the method of measuring it. Mention the circumstances which cause it to rise or fall.
3. What constitutes vision, and what audition?
4. How is animal heat developed?

CHEMISTRY.

1. Define chemical affinity and state the various circumstances or influences that modify it.
2. Calculate the weight of each element in 98 milligrams of sulphate of lime.
3. Describe some method of determining the quantity of HNO_3 in river water.
4. What group of metals is precipitated by HCl ?
5. Describe the methods of determining the specific gravity of solid bodies.

MATERIA MEDICA AND THERAPEUTICS.

1. Describe the action of antipyretics, and name some of the principal substances used as such.
2. Describe the difference of action between digitalis, aconite, and veratrum viride.
3. Where is cinchona bark found and what are its principal alkaloids?
4. What is atropia, eserine? Give the action of each.

SURGERY.

1. Describe the operation of ligation of the lingual artery and name the parts incised.
2. Describe the operation of lumbar nephrectomy. For what diseases is this operation warranted?
3. What is the pathology of piles? Mention the various operations for relief or cure.
4. What are the indications for enterotomy and enterectomy? Describe the operations and give your method of making the toilet.
5. Give etiology, pathology, and treatment of the various kinds of aneurysm.

PRACTICE.

1. Define neuralgia and enumerate the etiological factors, and give symptoms and treatment.
2. What parasites, animal and vegetable, infest the skin, intestines, blood, and muscles? What diseases do they cause and what is the treatment?
3. Describe the exanthematous diseases.
4. Give the various reasons for believing that certain diseases are caused by certain microorganisms.

OBSTETRICS AND GYNÆCOLOGY.

1. Give the pathology, symptomatology, and treatment of vaginismus.
2. How would you manage a case of threatened abortion and one of inevitable abortion?
3. Describe the anterior and posterior lateral inclined planes and their relation to the mechanism of labor.
4. Give the various displacements of the uterus, their causes, symptoms, and treatment.

HYGIENE.

1. How would you detect sewer gas in a room?
2. In hospital practice what precautions would you take against the spread of typhoid fever from a patient in a ward?
3. Name the best disinfectants and deodorizers, and give the mode of action.
4. Describe the changes which take place in a human dead body for the first ten years after ordinary inhumation.

AID TO OTHER BRANCHES OF THE GOVERNMENT SERVICE.

AID TO THE UNITED STATES ARMY AND NAVY.

The benefits of the United States Marine-Hospital Service were, after the commencement of hostilities with Spain, extended to the United States Army and the United States Navy, the Marine-Hospital Service to be reimbursed the actual cost of maintenance.

With a view to such an arrangement I addressed the following letter to you on the subject:

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL, M. H. S.,
Washington, D. C., April 26, 1898.

SIR: I inclose herewith a letter from Surg. R. D. Murray, in command of the United States marine hospital at Mobile, Ala., and invite your attention to that portion of the same in which it is stated that offer has been made to the commanding surgeon at Mobile, Ala., to permit the reception into the United States marine hospitals of such patients of the Army as may be better treated in hospital than in tents.

During the war of the rebellion most of the marine hospitals were used by the Army or the Navy or both, and it is more than probable that the facilities afforded by the marine hospitals and the United States quarantine stations will in emergency be availed of by the Army and the Navy.

Under these circumstances it becomes necessary to arrive at some conclusion as to the method of admission of patients and as to the expense incurred for their maintenance. I inclose herewith a report of the Senate Committee on Public Health and Quarantine upon an amendment to the sundry civil bill relating to this matter. The amendment was rejected on a point of order, but the report contains a list of hospitals and quarantine stations, showing the accommodations available at each, and is transmitted herewith on this account.

The matter is brought to your attention at the present time in anticipation of action that may be taken under emergency and to prepare for the same.

It is respectfully suggested that a proper procedure would be to issue an order to be signed by the Secretary of the Treasury and the President authorizing the commanding officers of marine hospitals and quarantine stations to receive and treat in their hospitals the soldiers and sailors of the United States upon the request of an authorized commanding officer, the marine hospital fund to be reimbursed through a bill to be rendered, the charge being sufficient to cover the daily cost of maintenance in hospital.

If this meets with your approval an order to this effect will be prepared in the Bureau for your signature and that of the President.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

The SECRETARY OF THE TREASURY.

Approved, April 26, 1898.

O. L. SPAULDING,

Acting Secretary.

[Inclosure.]

[Senate Document No. 232, Fifty-fifth Congress, second session.]

There are in the United States 22 marine hospitals and 11 United States quarantine stations. The marine hospitals are located as follows:

Location.	Capacity of hospital.	Location.	Capacity of hospital.
Baltimore, Md	100	Mobile, Ala	49
Boston, Mass	150	New Orleans, La	100
Cairo, Ill	65	New York, N. Y	200
Chicago, Ill	200	Portland, Me	50
Cincinnati, Ohio	75	Port Townsend, Wash	60
Cleveland, Ohio	50	San Francisco, Cal	140
Detroit, Mich	75	St. Louis, Mo	100
Evansville, Ind	50	Vineyard Haven, Mass	40
Key West, Fla	50	Wilmington, N. C	20
Louisville, Ky	50	Hospital and barracks at Cape	
Hospital and barracks at Delaware		Charles Quarantine	1,000
Breakwater	1,000		
Memphis, Tenn	65	Total	3,680

The United States quarantine stations are located as follows:

Reedy Island Quarantine, via Port Penn, Del.
 Delaware Breakwater Quarantine, Lewes, Del.
 Cape Charles Quarantine, Fortress Monroe, Va.
 Cape Fear Quarantine, Southport, N. C.
 South Atlantic Quarantine, via Inverness, Ga.
 Brunswick Quarantine, Brunswick, Ga.
 Tortugas Quarantine, via Key West, Fla.
 Gulf Quarantine, via Biloxi, Miss.
 San Diego Quarantine, San Diego, Cal.
 San Francisco Quarantine, Angel Island, Cal.
 Port Townsend Quarantine, Port Townsend, Wash.

These Government hospitals are all in commission, having a full complement of officers and attendants and equipped with the best ward furniture, modern aseptic outfit for operating rooms, ambulance, etc. The nurses are trained, and the hospital discipline is similar to that in army and navy hospitals. The commissioned corps of medical officers comprises 16 surgeons, 32 passed assistant surgeons, and 22 assistant surgeons.

In case war was declared the restrictions which would be placed upon the merchant marine of the United States would greatly reduce the number of patients from merchant vessels eligible to relief in United States marine hospitals and permit of the reception of a large number of sick or wounded soldiers or sailors from the Army and Navy.

If necessary, temporary ward extensions could be made to many of the Southern hospitals with little expense, which would increase the hospital capacity. Temporary hospitals could also be erected upon some of the quarantine reservations, so isolated as to render them safe to troops who might be sent there. Patients suffering from protracted malarial diseases could be sent to the hospitals North, where the climate would benefit them, and those suffering from acute diseases or injuries requiring immediate attention could be provided for in the hospitals located upon the Gulf and South Atlantic coast. In case troops are landed in Cuba or sent South during the summer, there will be many who will become disabled from fevers incident to climate and exposure, who will require hospital treatment. * * *

EXTENSION OF RELIEF—ARMY AND NAVY.

TREASURY DEPARTMENT,

OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,

Washington, D. C., May 2, 1898.

To Medical Officers of the Marine-Hospital Service:

The United States marine hospitals are hereby made available for the reception of the sick and wounded of either the United States Army or the United States Navy, and you are hereby directed, upon a written request of the proper military or naval authority, to receive and care for said patients, the Marine-Hospital Service to be reimbursed the actual cost of maintenance.

WALTER WYMAN,

Supervising Surgeon-General M. H. S.

Approved:

L. J. GAGE, *Secretary.*

EXECUTIVE MANSION, *May 2, 1898.*

Approved:

WILLIAM MCKINLEY.

RATE OF CHARGE FOR SOLDIERS AND SEAMEN ADMITTED TO MARINE HOSPITALS.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., July 1, 1898.

To Medical Officers in Command of United States Marine Hospitals:

The rate of charge for soldiers and seamen admitted to United States marine hospitals under the provisions of Department Circular No. 73, dated May 2, 1898, is hereby fixed at a uniform rate of 30 cents per diem.

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

Approved:

O. L. SPAULDING,
Acting Secretary.

RELIEF FOR OFFICERS AND MEN OF THE NAVY.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., July 1, 1898.

To Commissioned Medical Officers and Acting Assistant Surgeons, United States Marine-Hospital Service:

Paragraph 470, Revised Regulations, United States Marine-Hospital Service, providing for the care and treatment of officers and seamen of the United States Navy and Coast Survey, is hereby construed to include all officers and enlisted men of the Navy (including the Coast Signal Service, U. S. N.), whether employed on vessels or ashore.

The rate of charge to be made for the care and treatment of said officers and men will be, at United States marine hospitals, 30 cents per diem, and at contract stations at the rate authorized by the annual circular entitled "Contracts for care of seamen."

The names of officers and men admitted to treatment in accordance with this circular, at contract stations, will be included in the regular monthly bill for care of seamen (Form 1923), and an additional bill will be rendered against the Navy Department on the same form, and transmitted to the Bureau at the close of each month.

WALTER WYMAN,
Supervising Surgeon-General, M. H. S.

Approved:

O. L. SPAULDING,
Acting Secretary.

SUMMARY OF RELIEF FURNISHED ARMY AND NAVY.

Since the inception of war with Spain to the date of this report the following number of cases of illness—medical and surgical—occurring among members of the United States Army and Navy, have been treated in marine hospitals.

The statement is given here by hospitals in which such patients were treated.

Locality.	United States Army.		United States Navy.	
	Medical treatment.	Surgical treatment.	Medical treatment.	Surgical treatment.
Portland, Me	1	2	0	0
Boston, Mass	87	4	0	0
New York, N. Y	92	40	0	0
Baltimore, Md	1	0	0	0
Wilmington, N. C	3	3	0	1
Charleston, S. C	0	0	0	1
Mobile, Ala	93	6	10	0
Key West, Fla	1	4	64	23
Galveston, Tex	0	0	0	1
Evansville, Ind	2	0	0	0
Cincinnati, Ohio	1	1	0	0
Cleveland, Ohio	3	1	0	0
St. Louis, Mo	1	1	0	0
San Francisco, Cal	95	5	0	0

Two hundred and thirty-three physical examinations were made of applicants for positions in the United States Naval Reserves, and of this number 21 were rejected.

In addition to this aid rendered to the Army and Navy during the late war with Spain, material assistance was given to them in the establishment at Montauk Point, Long Island, of the temporary quarantine station for returning troops from Cuba, which station is fully described elsewhere in this report.

Returning troops from Cuba were also received at the detention camp at Egmont Key, near Port Tampa, Fla., and held there until their probation period had expired.

ACKNOWLEDGEMENT OF AID RENDERED THE COAST SIGNAL SERVICE.

NAVY DEPARTMENT.

OFFICE OF COAST SIGNAL SERVICE.

Washington, August 17, 1898.

SIR: Referring to your circular letter of July 1, 1898. I wish to call your attention to the fact that in accordance with the orders of the Secretary of the Navy, the coast signal stations are being abandoned and this service is being put out of commission as rapidly as possible. There will, therefore, not be any necessity for your Service to render any further aid to this service.

In closing I wish to express my thanks and appreciation of the hearty cooperation and of the valuable assistance rendered the Coast Signal Service by the medical officers attached to your Service.

In making my report to the Secretary of the Navy I will take a great deal of pleasure in bringing to his attention a statement of the valuable assistance which I have received.

Very respectfully,

JOHN R. BARTLETT,
Superintendent.

SUPERVISING SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

Washington, D. C.

AID TO THE REVENUE-CUTTER SERVICE.

Three officers of the Revenue-Cutter Service were examined as regarded their physical condition, to determine their fitness in this respect for promotion. Twenty-eight candidates for the position of cadet in the Revenue-Cutter Service were examined physically during the year, and of this number 4 were rejected, while 7 applicants for the position of assistant engineer were examined as regards their physical fitness for the service.

One thousand one hundred and three seamen of the Revenue-Cutter Service were also examined prior to enlistment and 182 rejected.

In addition to the aid rendered the Revenue-Cutter Service by these boards in determining the physical condition of those applying for employment therein, a medical officer of the Marine-Hospital Service was detailed to duty on the United States revenue cutter *Hugh McCulloch*, to accompany this vessel on her voyage from New York to San Francisco via the Suez Canal. At the date of this report, this officer, Asst. Surg. J. B. Greene, is still on duty on board the *McCulloch*, which vessel is attached to the naval squadron under the command of Rear-Admiral Dewey, U. S. N., at Manila.

AID TO THE UNITED STATES LIFE-SAVING SERVICE.

During the year ending June 30, 1898, there were 2,143 physical examinations made of keepers and surfmen of the United States Life-Saving Service. Of this number 126 were rejected as not being up to the physical standard required.

One hundred and sixty-five claims for pensions and other benefits provided by the act of May 4, 1882, made by keepers and crews of life-saving stations, have been passed upon in this office during the same period.

AID TO THE INSPECTION SERVICE OF STEAM VESSELS.

During the fiscal year 1898, 1,064 applicants for license as pilots were examined as regards their ability to distinguish colors, and 54 were rejected on account of color blindness.

AID TO THE IMMIGRATION SERVICE.

Medical officers of the Marine-Hospital Service have been detailed for medical inspection of immigrants at the following ports: Portland, Me.; Boston, Mass.; New York, N. Y.; Philadelphia, Pa.; Baltimore, Md.; New Orleans, La.; Galveston, Tex.; San Francisco, Cal., and Portland, Oreg.

Following is the summary of reports from each station during the fiscal year:

Portland, Me.—Number of immigrants inspected, 596; rejected, none.

Boston, Mass.—Number of immigrants inspected from Europe, 9,474; from Canada, 2; total, 9,476. Number rejected, 36. Causes for rejection:

Tubercle of lung.....	3	Tubercle of lymphatic gland, neck ..	1
Atrophy of leg.....	1	Ulcerated throat.....	1
Kyphosis.....	1	Impaired intellect.....	3
Impaired vision.....	1	Infected wound.....	1
Deformed foot.....	1	Sprain ankle.....	1
Total blindness and cataract.....	1	Cataract.....	1
Miscarriage on ship.....	1	Senility.....	2
Coxalgia.....	1	Debility.....	4
Chronic articular rheumatism.....	1	Ankylosis.....	4
Pregnancy.....	1	Artificial leg.....	1
Clubfoot.....	1	Insanity.....	2
Favus of scalp.....	1	Idiocy.....	1

New York, N. Y.—Number of immigrants inspected, 198,519; physically examined and sent to hospital for treatment, 1,097; rejected and sent before board of special inquiry for action, 883; certified to and sent before board of special inquiry for action, 504.

Of the above number of rejected cases, 396 have been deported for the following causes:

Favus.....	94	Tubercle of lung.....	10
Trachoma.....	110	Insane.....	18
Syphilis.....	4	Bodily infirmities.....	160

Philadelphia, Pa.—Number of immigrants inspected, 8,927; rejected, 37. Causes for rejection:

Skoliosis of spine.....	1	Ankylosis of knee joint.....	2
Old age.....	6	Necrosis (femur).....	1
Paralysis.....	1	Tubercular glands of neck.....	1
Kyphosis.....	2	Conjunctivitis.....	4
Measles.....	1	Blepharitis marginalis.....	5
Pregnancy.....	4	Tumor.....	1
Imbecility.....	1	Anæmia.....	1
Bright's disease.....	1	Bodily infirmity.....	4
Hernia.....	1		

Baltimore, Md.—Number of immigrants inspected, 10,978; number rejected, 2. Causes of rejection:

Acute mania.....	1	Imbecile.....	1
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New Orleans.—Number of immigrants inspected, 1,624; number rejected, none.

Galveston, Tex.—Number of immigrants inspected, 369; number rejected, 2 (kyphosis, 1; deafness, 1).

San Francisco, Cal.—Number of immigrants inspected, 2,274; number rejected, 1.

Portland, Oreg.—Number of immigrants inspected, 126. No rejections.

THE TRANS-MISSISSIPPI EXPOSITION AT OMAHA, NEBR.

In response to an invitation to make a Service exhibit at the Trans-Mississippi and International Exposition, which was held at Omaha, Nebr., June 1 to November 1, 1898, an exhibit of the various operations of the Marine-Hospital Service was prepared and forwarded to the Government building at the exposition. This exhibit was very similar in character to that prepared for and shown at the exposition in 1897 at Atlanta, Ga., and was installed by Passed Assistant Surgeon Kinyoun, who was largely instrumental in arranging it. Afterwards it was under the charge of Asst. Surg. Hill Hastings until the increased work of the Service during the late summer made it impossible to continue the detail of a regular officer at the exposition, and accordingly Dr. Hastings was relieved late in August and was replaced at the exposition by a noncommissioned officer.

SHELTER FOR DECK CREWS ON WESTERN RIVERS.

This subject, which has been treated of in the annual reports of the Service for 1873, 1874, 1876-77, 1882, 1895, 1896, and in my last report, is one of special interest to the Service, on account of the large number of cases of illness among those employed on boats plying on the Western rivers which can be attributed directly to the lack of shelter for the crews.

As stated in my last report to you during the previous session of Congress, a bill had been passed and had received the approval of the President, March 3, 1898, which enacted that—

every steamboat of the United States plying upon the Mississippi River or its tributaries shall furnish an appropriate place for the crew. * * * providing sleeping room in the engine room of the steamboat properly protected from the cold, winds, and rain by means of suitable awnings or screens on either side of the guards or sides and forward * * * and shall be properly heated.

On the 21st of June, 1898, the following circular was issued to masters and owners of Western river steamers and inspectors of steam vessels on the Mississippi River and tributaries:

TO PROVIDE SLEEPING ROOM FOR CREWS OF STEAMERS PLYING THE MISSISSIPPI RIVER AND TRIBUTARIES.

TREASURY DEPARTMENT.

OFFICE OF THE SUPERVISING INSPECTOR-GENERAL.

Washington, D. C., June 21, 1898.

To Masters and Owners of Western River Steamers, and

Inspectors of Steam Vessels on the Mississippi River and Tributaries:

Your attention is called to the following extract from section 2 of the act of Congress approved March 3, 1897:

AN ACT to amend the laws relating to navigation.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

* * * * *

SEC. 2. That * * * on and after June thirtieth, eighteen hundred and ninety-eight, every steamboat of the United States plying upon the Mississippi River or its tributaries shall furnish an appropriate place for the crew, which shall conform to the requirements of this section so far as they shall be applicable thereto

by providing sleeping room in the engine room of the steamboats properly protected from the cold, winds, and rain by means of suitable awnings or screens on either side of the guards or sides and forward, reaching from the boiler deck to the lower or main deck, under the direction and approval of the Supervising Inspector-General of Steam Vessels, and shall be properly heated.

Any failure to comply with this section shall subject the owner or owners to a penalty of five hundred dollars.

* * * * *

Approved, March 3, 1897.

Local inspectors of steam vessels will, on and after July 1, 1898, require the master, owner, or agent of all steamers navigating on the waters named in the act above quoted, to be furnished for the protection of the crews thereof "with suitable awnings or screens on either side of the guards or sides and forward, reaching from the boiler deck to the lower or main deck:" *Provided*, however, that steam vessels whose engine rooms are closed in by permanent joiner works, sides and bulkheads, such steamers will be deemed to be in compliance with law, without further equipment for the protection of their crews, other than the necessary sleeping accommodations.

Such screens or awnings must be so arranged by fastening to the upper and lower decks sufficiently close as to shut out rain, or snow, or drafts of wind, and must extend along the sides, and also athwartships the vessel.

The inclosed place required for crew may be located between the forward and after end of boiler deck, where most practicable and convenient to accomplish the object sought in the act herein quoted.

Inspectors of steam vessels will promptly report to this office the refusal or neglect on the part of the master, owner, or agent of any steam vessel in their local district to comply with this law, and the regulations herein provided for, and shall also report such offense to the collector of customs, who will impose the penalty prescribed by law and forward to the Secretary of the Treasury any application that may be made for the remission of such penalty as provided in article 973 of the Regulations of 1892.

JAS. A. DUMONT,

Supervising Inspector-General.

Approved:

O. L. SPAULDING,

Acting Secretary.

In my report to the Secretary of the Treasury for the fiscal year 1896, I reported at length the case of two seamen of the steamer *Anna B. Adams*, who were admitted to the care of the United States Marine-Hospital Service at Shreveport, La., suffering with frost-bitten extremities as a result of enforced exposure, no shelter for the crews being provided.

The matter was referred by Acting Assistant Surgeon Booth, in charge of relief at Shreveport, to the United States district attorney, and the master and mate of the steamer were indicted, but were acquitted under a technicality. (See Report of the Marine-Hospital Service, 1896, pp. 22, 23.)

The following letter from Acting Assistant Surgeon Booth shows that judgment was finally given to the plaintiffs by the United States district court.

OFFICE OF MEDICAL OFFICER IN COMMAND, M. H. S.,

Shreveport, La., March 12, 1898.

SIR: I have the honor to inform you that among the admiralty decisions handed down on the 10th instant by United States district court for the eastern district of Louisiana, in New Orleans, were two of interest to this station, viz:

Seaman Charles Evans *v.* The Red River Line. Judgment for plaintiff for \$1,000 and costs.

Seaman John Reed v. Same. Judgment for \$1,400 and costs.

Seamen Evans and Reed were two of a number of the crew of the steamer *Anna B. Adams*, one of the boats of the Red River line, which left this port on or about February 5, 1895, and returned on the 9th with the whole deck crew more or less frost-bitten, as a result of cruelty of the mate.

The United States court was then in session here. I brought the matter to the attention of the United States district attorney, and appeared before the grand jury, which resulted in the indictment of the mate under section 5347, United States Revised Statutes.

The result of the trial is set forth in a letter from United States attorney, Hon. Charles W. Seals. (See Annual Report Marine-Hospital Service, 1896, pp. 22, 23.)

From the decision of the court for the eastern district of Louisiana, on the 10th instant, it appears the judge erred in his instructions to the jury to acquit.

It is to be hoped the recent judgments will have a salutary effect in restraining mates in their cruel acts and deeds upon the men, which was not had from the indictment and trial of the mate of the *Anna B. Adams*.

I am, sir, very respectfully,

A. R. BOOTH.

Acting Assistant Surgeon M. H. S.

SUPERVISING SURGEON-GENERAL MARINE-HOSPITAL SERVICE,

Washington, D. C.

DEATHS OF SEAMEN OF FOREIGN COUNTRIES TO BE REPORTED TO THE CONSUL OF THE COUNTRY OF WHICH THE DECEASED SEAMAN WAS A CITIZEN OR A SUBJECT.

In order to facilitate the proper distribution of the effects of foreign seamen who die in this country or on American vessels, the Bureau of Navigation issued the following circular, copies of which have been forwarded to the officers of this Service for their information and compliance therewith.

TREASURY DEPARTMENT, BUREAU OF NAVIGATION,

Washington, D. C., May 9, 1898.

To United States Shipping Commissioners and others:

To facilitate the proper distribution of the effects of deceased seamen of foreign countries, which may be intrusted to your custody, to the legal heirs of such seamen, you are instructed:

First. When the nationality of a deceased foreign seaman whose effects have been intrusted to your custody is ascertained by you, you will communicate the fact of the death of said deceased foreign seaman, and that his effects are in your custody, to the nearest consul of the nation of which the deceased seaman was a citizen or subject.

Second. Upon application you may, in your judgment, then permit said consul in person to make such an examination of the effects as may tend to identify the deceased.

Respectfully, yours,

EUGENE T. CHAMBERLAIN, *Commissioner.*

Approved:

O. L. SPAULDING, *Assistant Secretary.*

TONNAGE TAX.

On July 19, 1898, the President issued a proclamation suspending the collection of tonnage duty upon vessels directly from the port of Copenhagen. The following circular was issued:

TONNAGE DUES ON VESSELS FROM THE PORT OF COPENHAGEN.

TREASURY DEPARTMENT, BUREAU OF NAVIGATION.

*Washington, D. C., July 21, 1898.**To Collectors of Customs and Others:*

The attention of the officers of the customs is invited to the appended proclamation by the President, dated July 19, 1898, declaring that vessels may be entered in the ports of the United States from the port of Copenhagen, without the payment of tonnage dues, under section 11 of the act of June 19, 1886, as amended by the act of April 4, 1888.

Vessels arriving from said port will hereafter be admitted to entry without the payment of said dues, unless they shall belong to a foreign country in whose ports the fees or dues imposed on American vessels or the import or export duties on their cargoes exceed the fees, dues, or duties imposed on the vessels of such country, or on the cargoes of such vessels.

Certified statements may be forwarded for a refund of the dues on tonnage aforesaid, paid on the entry from the port of Copenhagen of vessels exempted from the tax, and which were entered at any port of the United States on or since July 19, 1898.

The proclamation does not apply to vessels which entered before that date, and the dues on such vessels were lawfully levied, and will be retained.

You are requested to notify this office of any tonnage tax, light-house dues, or other equivalent tax or taxes, which may be imposed hereafter on vessels of the United States in the port of Copenhagen; and you will exercise care to levy tonnage dues on all vessels from said port of any foreign country which discriminates in its ports, as mentioned above, and in the proclamation, against vessels of the United States or their cargoes, in favor of its own vessels.

Information has been received showing that vessels belonging to Great Britain, Austria-Hungary, France, Germany, Denmark, Holland, Sweden, Norway, Belgium, Portugal, Italy, and Japan, arriving in the United States and entered from the port of Copenhagen only, may be admitted under the proclamation without payment of the dues above mentioned. Cases of vessels entering from Copenhagen and also from some other foreign place must be considered specially in connection with the regulations applicable.

EUGENE T. CHAMBERLAIN.

Commissioner.

Approved:

O. L. SPAULDING, *Acting Secretary.*

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA.

A PROCLAMATION.

Whereas satisfactory proof has been given to me that no tonnage or light-house dues or any equivalent tax or taxes whatever are imposed upon vessels of the United States in the port of Copenhagen, in the Kingdom of Denmark:

Now, therefore, I, William McKinley, President of the United States of America, by virtue of the authority vested in me by section eleven of the act of Congress, entitled "An act to abolish certain fees for official services to American vessels, and to amend the laws relating to shipping commissioners, seamen, and owners of vessels, and for other purposes," approved June nineteenth, one thousand eight hundred and eighty-six, and in virtue of the further act amendatory thereof, entitled "An act to amend the laws relating to navigation and for other purposes," approved April fourth, one thousand eight hundred and eighty-eight, do hereby declare and proclaim that from and after the date of this, my proclamation, shall be suspended the collection of the whole of the tonnage duty which is imposed by

said section eleven of the act approved June nineteenth, one thousand eight hundred and eighty-six, upon vessels entered in the ports of the United States directly from the port of Copenhagen, in the Kingdom of Denmark.

Provided, That there shall be excluded from the benefits of the suspension hereby declared and proclaimed the vessels of any foreign country in whose ports the fees or dues of any kind or nature imposed on vessels of the United States, or the import or export duties on their cargoes, are in excess of the fees, dues, or duties imposed on the vessels of such country or on the cargoes of such vessels; but this proviso shall not be held to be inconsistent with the special regulation by foreign countries of duties and other charges on their own vessels, and the cargoes thereof, engaged in their coasting trade, or with the existence between such countries and other States of reciprocal stipulations founded on special conditions and equivalents, and thus not within the treatment of American vessels under the most favored nation clause in treaties between the United States and such countries.

And the suspension hereby declared and proclaimed shall continue so long as the reciprocal exemption of vessels belonging to citizens of the United States and their cargoes shall be continued in the said port of Copenhagen and no longer.

In witness whereof I have hereunto set my hand and caused the seal of the United States to be affixed.

Done at the city of Washington, this 19th day of July, in the year of our Lord one thousand eight hundred and ninety-eight, and of the Independence of the United States the one hundred and twenty-third.

[SEAL.]

WILLIAM McKINLEY.

By the President:

WILLIAM R. DAY.

Secretary of State.

MARINE HOSPITALS AND RELIEF FURNISHED.

During the fiscal year 1898 the total number of patients treated by this Service was 52,709, of which number 11,914 were treated in the hospitals of the Service and in the hospitals at contract stations, and the remainder (40,795) were treated as out-patients.

INSPECTION OF STATIONS OF THE SERVICE.

The following inspection blanks to be used in the inspection of marine-hospital stations of the first, second, third, and fourth class have been adopted, and are now in use:

REPORT OF INSPECTION OF STATIONS OF CLASS 1.

Instructions to inspector.

1. Your visit to the station should be unannounced.
2. Upon arrival at the port you will first call upon the commanding officer and arrange with him for an inspection of the hospital, which should be made as soon after arrival as practicable.
3. You will then visit the office where out-relief is furnished.
4. You will make appropriate entries to each question of this inspection blank, and forward to this office upon the completion of your duty.

WALTER WYMAN.

Supervising Surgeon-General U. S. Marine-Hospital Service.

Name of station. _____.

When was station last inspected? _____.

Name of inspector. _____.

I. PERSONNEL.

- Name and rank of officer in command of station. ———.
- Give number of members in family. ———.
- Date of assignment to duty. ———.
- Name and rank of assistants, with dates of assignment, including acting assistant surgeons and internes; also give number of members in each family. ———.
- Number of stewards and number of members in each family. ———.
- Name, duties, and pay of each attendant. ———.
- Is there necessity for additional officers or employees? If so, give reasons. ———.

II. HOSPITAL.

- Location of building used as hospital. ———.
- Describe general construction of the hospital building. ———.
- Describe the wards:
- (a) Dimensions. ———.
 - (b) Number of beds in each ward. ———.
 - (c) How many beds can be added for emergencies? ———.
 - (d) Cubic air space allowed each patient. ———.
 - (e) Heating. ———.
 - (f) Lighting. ———.
 - (g) Ventilation. ———.
 - (h) What kind of bedsteads and what kind of mattresses and bedding. ———.
 - (i) Report upon condition of bedding used by the patients. ———.
- Are separate rooms or wards provided for the treatment of officers? ———.
- Give number of beds. ———.
- What is the condition of wards as to cleanliness? ———.
- Is there an operating room? ———.
- Is it properly equipped? ———.
- Is the force of nurses sufficient? ———.
- Are those so employed trained to their duties? ———.
- Does the character of the diet furnished conform to that prescribed by the regulations? ———.
- Give number of patients in hospital on date of inspection. ———.
- Are the patients under treatment in hospital correctly recorded in the register, and are all present? ———.
- If any patients are not at hospital at time of examination, state why. ———.
- What is the practice in regard to allowing patients to leave the hospital? ———.
- Are they allowed to remain out overnight? ———.
- Are the cases under treatment proper ones for hospital relief? ———.
- Are the medicines administered to patients by the nurses or left with patients for self-administration? ———.
- Give name and diagnosis of patients who have been under treatment in hospital for a period of one year or more. ———.
- State whether, after careful examination, you recommend the discharge of any of these patients. ———.
- Is the clinical record system properly kept? ———.
- What precautions are taken with tuberculous patients? ———.
- What was the average cost of a ration for the past fiscal year? ———.
- Is there a complete set of annual reports, Marine-Hospital Service, on file? ———.
- Are the records of the station properly kept, and up to current work? ———.
- Describe general construction of the outbuildings. ———.
- Is there an isolation ward? ———.
- Give number of beds. ———.

Is there an autopsy room? ———.

Is it properly equipped? ———.

Describe officers' quarters and condition of furniture therein? ———.

Describe steward's and attendants' quarters and condition of furniture therein.

How are rations supplied to the steward, and is a proper record kept of the same? ———.

Describe hospital dining room and condition of table furniture and tableware? ———.

State the condition of kitchen and its equipment. ———.

State the condition of dispensary. ———.

State the condition of laundry. ———.

State the condition of road approaches to hospital. ———.

State the condition of fences and grounds. ———.

State condition of engine room. ———.

State condition of heating apparatus. ———.

Describe water supply. ———.

Describe drainage and condition of water-closets. ———.

What is the method of disposal of garbage? ———.

State whether any animals not authorized by the Department are kept on reservation. ———.

III. STABLE AND GARDEN EQUIPMENT.

State, approximately, the age and condition of each horse, and how long in service at this station. ———.

Give number and character of vehicles. ———.

Do they appear properly cared for? ———.

Are harnesses in good condition? ———.

Are the tools and garden implements in good condition? ———.

IV. DISCIPLINE.

Are officers supplied with uniforms in accordance with the regulations governing uniforms? ———.

Are attendants supplied with uniforms in accordance with the regulations governing uniforms? ———.

State omissions, if any, in each case. ———.

Are uniforms properly worn? ———.

Give method of granting leaves to officers and employees. ———.

Describe facilities for managing a fire as shown by drill performed in your presence. ———.

Describe the methods of conducting inspection and muster as performed in your presence. ———.

V. OFFICE OR OUT-RELIEF.

Is the room for the examination of marine-hospital patients suitable for the purpose? ———.

What is the location and distance from hospital? ———.

Is it kept clean and in order? ———.

Is it satisfactorily equipped for dispensary purposes? ———.

What are the facilities for reaching the hospital? ———.

Is the supply of medicines sufficient? ———.

What is the condition of the public property (furniture, medicines, implements, instruments, etc.)? ———.

What records are kept? ———.

Are they correctly kept and up to current work? ———.

VI. GENERAL ADMINISTRATION.

Give number of marine-hospital patients treated during the last fiscal year. _____.

Give the number treated during the present fiscal year to date of report. _____.

Are supplies received and issued in conformity with paragraphs 140 and 141 of the Regulations? _____.

Give average duration of treatment in hospital of patients under treatment at date of inspection. _____.

Give the number of out-patients during the last fiscal year and the number of out-patients during the present fiscal year to date of report. _____.

Give the ratio of hospital to out-patients during the last fiscal year and during the present fiscal year to date of report. _____.

Give annual amount expended at station for the past three years. (See Annual Reports.) _____.

Does the method of disposing of the effects and moneys of seamen conform to the regulations? _____.

Does the amount of money on hand correspond with the record (Form 1950)? _____.

Give the immediate needs of the station as stated by the commanding officer. _____.

VII. REMARKS AND RECOMMENDATIONS.

I certify that the foregoing is a careful and correct statement of the condition of the Service at the port of _____, inspected by me this _____ day of _____, 189—.

Surgeon, U. S. M. H. S., Inspector.

REPORT OF INSPECTION OF STATIONS OF CLASS 2.

Instructions to inspector.

1. Your visit to the station should be unannounced.
2. Upon arrival at the port you will first call upon the medical officer in command and arrange with him for an inspection of the hospital, which should be made as soon after arrival as practicable.
3. You will then visit the office where out-relief is furnished.
4. You will make appropriate entries to each question of this inspection blank and forward to this office upon the completion of your duty.

WALTER WYMAN,
Supervising Surgeon-General U. S. Marine-Hospital Service.

I. PERSONNEL.

Name of relief station. _____.

Name and rank of officer in command of station. _____.

Date of assignment. _____.

Name, rank, and pay of subordinates. _____.

Dates of assignment or employment. _____.

Name of contractor furnishing quarters, etc. _____.

How long has contract been held by present party? _____.

Is there competition for it annually? _____.

What is the charge per diem? _____.

When was the station last inspected? _____.

Name of inspecting officer. _____.

Are officers and employees supplied with uniforms in accordance with the regulations governing the same? ———.

Is there necessity for additional officer or employee? If so, give reasons. ———.

II. HOSPITAL.

Location of building used as hospital. ———.

Is there a resident physician or graduated interne employed? ———.

Is it used entirely for hospital purposes; and if not, for what other purpose is it used? ———.

Describe general construction. ———.

Are the marine-hospital patients treated in separate wards? ———.

Describe the wards occupied by marine-hospital patients:

(a) Dimensions. ———.

(b) Number of beds in each ward. ———.

(c) Cubic air space allowed each patient. ———.

(d) Heating. ———.

(e) Lighting. ———.

(f) Ventilation. ———.

Is there a modern operating room? ———.

Hospital furniture:

(a) What kind of bedsteads, and what kind of mattresses and bedding? ———.

(b) Report upon the condition of bedding used by marine-hospital patients. ———.

(c) Are the beds clean and free from vermin? ———.

What is the condition of wards as to general cleanliness? ———.

Is the nursing sufficient, and is the nurse employed trained to the duties? ———.

Is the character of the diet furnished the same or equal to that prescribed in the Diet Table for marine hospitals? ———.

If not, what is the ordinary diet furnished? ———.

Is extra diet furnished for special cases? ———.

Are the patients under treatment in hospital correctly recorded in the register, and are all present? ———.

If any marine-hospital patients are not at hospital at time of examination, state why. ———.

What is the practice in regard to allowing marine-hospital patients to leave the hospital? ———.

Are they allowed to remain out over night? ———.

Are the cases under treatment proper ones for hospital relief? ———.

Are the medicines administered to patients by the nurses or left with the patients for self-administration? ———.

III. OFFICE OR OUT-RELIEF.

Is the room for the examination of marine-hospital patients suitable for the purpose? ———.

Location and distance from hospital. ———.

Is it kept clean and in order? ———.

Is it satisfactorily equipped for dispensary purposes? ———.

What are the facilities for reaching the hospital? ———.

Is the supply of medicines sufficient? ———.

What is the condition of the public property (furniture, medicines, implements, instruments, etc.)? ———.

What records are kept? ———.

Are they correctly kept and up to current work? ———.

Are copies of reports kept on file? ———.

IV. GENERAL ADMINISTRATION.

Give number of marine-hospital patients treated during the last fiscal year. ———.

Give number treated during the present fiscal year to date of report. ———.

Give number of patients in hospital on date of inspection. ———.

Number of days' relief furnished marine-hospital patients during the last fiscal year. ———.

Give average duration of treatment in hospital. ———.

Give number of out-patients during the last fiscal year. ———.

Give number of out-patients during the present fiscal year to date of report. ———.

In your opinion, are marine-hospital patients sent to hospital who might be treated at the office? ———.

Give the ratio of hospital to out-patients during the last fiscal year. ———.

Give the ratio of hospital to out-patients during the present fiscal year to date of report. ———.

Does the method of caring for and disposing of the effects and moneys of seamen conform to the regulations? ———.

Does the amount of money on hand correspond with the record (Form 1950)? ———.

V. REMARKS AND RECOMMENDATIONS.

I certify that the foregoing is a careful and correct statement of the condition of the Service at the port of ———, inspected by me this ——— day of ———, 189—.

Surgeon, U. S. M. H. S., Inspector.

REPORT OF INSPECTION OF STATIONS OF CLASS 3.

Instructions to inspector.

1. Your visit to the station should be unannounced.
2. Upon arrival at the port you will first call upon the acting assistant surgeon and arrange with him for an inspection of the hospital, which should be made as soon after arrival as practicable.
3. You will then visit the office where out-relief is furnished.
4. You will then call upon the collector of customs, if that officer issues relief certificates, and examine the records of the same.
5. You will make appropriate entries to each question of this inspection blank and forward to this office upon the completion of your duty.

WALTER WYMAN,

Supervising Surgeon-General U. S. Marine-Hospital Service.

I. PERSONNEL.

Name of relief station. ———.

Name of acting assistant surgeon. ———.

Date of appointment. ———.

Number of employees. ———.

Names, pay, and dates of appointment. ———.

Name of contractor furnishing quarters, etc. ———.

How long has contract been held by present party? _____.
 Is there competition for it annually? _____.
 What is the charge per diem? _____.
 When was the station last inspected? _____.
 Name of inspecting officer. _____.

II. HOSPITAL.

Location of building used as hospital. _____.
 Is it used entirely for hospital purposes; and if not, for what other purpose is it used? _____.

Describe general construction. _____.

Are the marine-hospital patients treated in separate wards? _____.

Describe the wards occupied by marine-hospital patients:

- (a) Dimensions. _____.
- (b) Number of beds in each ward. _____.
- (c) Cubic air space allowed each patient. _____.
- (d) Heating. _____.
- (e) Lighting. _____.
- (f) Ventilation. _____.

Hospital furniture:

- (a) What kind of bedsteads, and what kind of mattresses and bedding? _____.
- (b) Report upon the condition of bedding used by marine-hospital patients. _____.
- (c) Are the beds clean and free from vermin? _____.

What is the condition of wards as to general cleanliness? _____.

Is the nursing sufficient, and is the nurse employed trained to the duties? _____.

Is the character of the diet furnished the same or equal to that prescribed in the diet table for marine hospitals? _____.

If not, what is the ordinary diet furnished? _____.

Is extra diet furnished for special cases? _____.

Are the patients under treatment in hospital correctly recorded in the register, and are all present? _____.

If any marine-hospital patients are not at hospital at time of examination, state why. _____.

What is the practice in regard to allowing marine-hospital patients to leave the hospital? _____.

Are they allowed to remain out over night? _____.

Are the cases under treatment proper ones for hospital relief? _____.

Are medicines administered to patients by the nurses or left with patients for self-administration? _____.

III. OFFICE OR OUT-RELIEF.

Is the room for the examination of marine-hospital patients suitable for the purpose? _____.

Location and distance from hospital. _____.

Is it kept clean and in order? _____.

Is it satisfactorily equipped for dispensary purposes? _____.

What are the facilities for reaching the hospital? _____.

Is the supply of medicines sufficient? _____.

What is the condition of the public property (furniture, medicines, implements, instruments, etc.)? _____.

What records are kept? _____.
 Are they correctly kept and up to current work? _____.
 Are copies of reports kept on file? _____.

IV. GENERAL ADMINISTRATION.

Give number of marine-hospital patients treated during the last fiscal year.
 _____.

Give number treated during the present fiscal year to date of report. _____.

Give number of patients in hospital on date of inspection. _____.

Number of days' relief furnished marine-hospital patients during the last fiscal year. _____.

Give average duration of treatment in hospital. _____.

Give number of out-patients during the last fiscal year. _____.

Give number of out-patients during the present fiscal year to date of report.
 _____.

In your opinion, are marine-hospital patients sent to the hospital who might be treated at the office? _____.

Give the ratio of hospital to out-patients during the last fiscal year. _____.

Give the ratio of hospital to out-patients during the present fiscal year to date of report. _____.

V. REMARKS AND RECOMMENDATIONS.

I certify that the foregoing is a careful and correct statement of the condition of the Service at the port of _____, inspected by me this ____ day of _____, 189-.

Surgeon, U. S. M. H. S., Inspector.

REPORT OF INSPECTION OF STATIONS OF CLASS 4.

Instructions to inspector.

1. Your visit to the station should be unannounced.
2. Upon arrival at the port you will first call upon the acting assistant surgeon, if there be such officer, and arrange with him for an inspection of the hospital, which should be made as soon after arrival as practicable.
3. You will then visit the office where out-relief is furnished.
4. You will then call upon the collector of customs, if that officer issues relief certificates, and examine the records of the same.
5. You will make appropriate entries to each question of this inspection blank and forward to this office upon the completion of your duty.

WALTER WYMAN.

Supervising Surgeon-General U. S. Marine-Hospital Service.

I. PERSONNEL.

Name of relief station. _____.
 Name of acting assistant surgeon. _____.
 Date of appointment. _____.
 When was the station last inspected? _____.
 Name of inspecting officer. _____.

II. OFFICE OR OUT-RELIEF.

What records are kept? _____.
 Are they correctly kept and up to current work? _____.
 Are copies of reports kept on file? _____.

III. GENERAL ADMINISTRATION.

Give number of marine-hospital patients treated during the last fiscal year. _____.

Give number treated during the present fiscal year to date of report. _____.

Number of days' relief furnished marine-hospital patients during the last fiscal year. _____.

Give average duration of treatment in hospital. _____.

Give number of out-patients during the last fiscal year. _____.

Give number of out-patients during the present fiscal year to date of report. _____.

In your opinion, are marine-hospital patients sent to the hospital who might be treated as out-patients? _____.

Give the ratio of hospital to out-patients during the last fiscal year. _____.

Give the ratio of hospital to out-patients during the present fiscal year to date of report. _____.

What are the facilities for transporting patients to the nearest marine hospital? _____.

IV. REMARKS AND RECOMMENDATIONS.

I certify that the foregoing is a careful and correct statement of the condition of the Service at the port of _____, inspected by me this _____ day of _____, 189-.

_____,
Surgeon, U. S. M. H. S., Inspector.

MARINE HOSPITALS.—STATEMENT BY STATIONS OF REPAIRS MADE AND NEEDED.

The following is a statement of repairs and alterations made during the fiscal year and of repairs and alterations still needed at the several marine hospitals:

Hospital at Baltimore, Md., (erected 1887).—Surg. George Purviance makes the following report of repairs and improvements at this hospital station.

A new disinfecting building has been completed at a cost of \$1,864, and the wards have been refurnished with new bedside stands, medicine cases, wheel tables, bed cradles, and window shades. Awnings have been placed on the surgeon's house and on the executive building.

The operating room has been refurnished with a complete new outfit of the newest pattern.

In addition, general repairs to the hospital have been made, at a cost of material only.

Under the head of ordinary repairs required during the ensuing fiscal year, which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Painting surgeon's house and repairs to porches and posts of ward buildings, \$200; repairs to plumbing, \$50; gravel for walks and driveways, \$500.

Hospital at Boston, Mass. (erected 1860).—Surg. Fairfax Irwin makes the following report of repairs and improvements at this hospital station:

Repairs to heating apparatus, \$242; repairs to roof, \$60; miscellaneous minor repairs, \$52.10. In addition, repairs to plumbing and woodwork have been performed by hospital attendants, at a cost of material only.

Under the head of improvements or unusual repairs for the ensuing year, for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Laundry building, \$5,000, including removal and reestablishment of present plant. The laundry machinery is now located in the basement of the main building, and the action of the machinery is causing injury to the partition walls, owing to vibration.

Under the head of ordinary repairs required during the ensuing fiscal year, which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Relaying tile floor, four verandas, 2,000 square feet, \$1,200; for painting ironwork, verandas, \$200; new floor, laundry, \$125; renewing pavement, south entrance hospital, \$100; material for miscellaneous repairs, to be done by hospital attendants, \$568.

Hospital at Cairo, Ill. (erected 1885).—Surg. P. C. Kalloch makes the following report of repairs and improvements at this hospital station:

Miscellaneous repairs to plumbing, \$182.74; miscellaneous repairs to heating apparatus, \$141.89; miscellaneous repairs to buildings, \$202.43; painting interior of surgeon's house, \$115; combined sterilizer and washer, \$822.78; water filter, \$406.50; buildings wired for electric lights, \$170.81; private ward furnished for officers, \$50; steam pipes covered with asbestos magnesium sectional covering, \$284.54.

Hospital at Chicago, Ill. (erected 1873).—Surg. H. W. Sawtelle makes the following report of repairs and improvements at this hospital station:

Cement sidewalk, stone walls, and fences on north and south sides of the reservation have been constructed, at a cost of \$6,895; repairs to heating apparatus, \$254.71; miscellaneous minor repairs, \$209.50

Under the head of improvements or unusual repairs for the ensuing year, for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Quarters for medical officer, \$12,000 (to provide for necessary rooms for attendants in main building, now occupied by surgeon); electric-light plant, \$8,000.

Under the head of ordinary repairs required during the ensuing fiscal year, which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Cement flooring in kitchen, \$257; repairing stone flagging of porches, \$125; repairs to water-closets, \$475; new flag pole, \$175; repairs to walk, \$150; new floor (ward F), \$150; repairing stone party wall, \$280; repairs to plastering, \$248; painting hall ways (four floors), \$1,100; painting and whitewashing basement (at cost of material), \$100.

Hospital at Cincinnati, Ohio (erected 1884).—Acting Asst. Surg. J. W. Stevenson, in temporary charge, makes the following report of repairs and improvements to this hospital station:

During the last fiscal year an additional story to the surgeon's cottage has been constructed, at a cost of \$1,985. The funds available for this improvement were appropriated by a special act of Congress. The first story of the surgeon's cottage was painted inside and outside, at a cost of \$260; repairs to roof, gutters, and chimney, executive building, \$172.50; miscellaneous minor repairs, \$158.42.

Under the head of ordinary repairs required during the ensuing fiscal year, which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: For general repairs to heating apparatus, paints, lumber, etc., \$300.

Hospital at Cleveland, Ohio (erected 1852).—Surg. D. A. Carmichael makes the following report of repairs and improvements at this hospital station:

New flagstaff, \$71.29; repairs to roofs, etc., damaged by storm, \$586; new ceilings, \$116.50; iron fence each side of reservation, \$415; steam-laundry machinery, \$1,479.51; steam disinfecting chamber, \$357.50; repairs to plumbing, \$55; rebuilding stone walls and erection of iron fence, \$2,000; miscellaneous minor repairs, \$281.91.

Under the head of ordinary repairs required during the ensuing fiscal year, which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Renewing plumbing, \$2,000; repairs to windows and doors in hospital, \$950; repairs to isolation ward, \$200; painting exterior and interior of buildings, \$1,000; cement floors, laundry and drying room, \$300; repairs to amphitheater, \$500; repairs to plastering, second story, \$500; repairs to operating room, \$900; total, \$6,350. This building is one of the old hospitals, having been in use for forty-six years, and under lease to a local institution for twenty years, and now requires extensive repairs to bring it up to good condition.

In addition to the above, the grounds about the building should be graded and improved; estimated cost, \$1,000; repairs to roadways, \$700.

Under the head of improvements or unusual repairs for the ensuing year, for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Surgeon's residence, \$10,000; new roof on hospital building, \$7,500; isolation ward, \$3,500.

Hospital at Detroit, Mich. (erected 1857).—Surg. John Godfrey makes the following report of repairs and improvements at this hospital station:

Repairs to plumbing, \$823.82; painting and repairs done by attendants, at a cost of material \$674.37; plastering surgeon's quarters and miscellaneous repairs, \$163.

Under the head of improvements or unusual repairs for the ensuing year, for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Additional wing to hospital, \$10,000; laundry building and machinery, \$5,000.

Under the head of ordinary repairs required during the ensuing fiscal year, which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Miscellaneous repairs to several portions of the building, most of which can be performed at the cost of material, the work to be performed by hospital attendants—lumber, iron piping, cement, etc.—\$350; improvements to operating room, \$565.

Hospital at Delaware Breakwater (established 1894).—P. A. Surg. George B. Young makes the following report of repairs and improvements at this station:

A new floor has been laid in the ward and all the woodwork in the ward given two coats of enamel paint. The dispensary has been shelved and a dispensing case constructed; the floor has been renewed and all shelving and woodwork enameled. Hot water has been supplied to the sink, and the sink which formerly emptied into the sand under the house has been connected with the sewer. The work has been done for the most part by the station force, but some additional labor has been employed. Some material was purchased and the balance furnished from stock on hand. The amount expended was \$60.

The kitchen and hall between main building and kitchen have been practically reconstructed. The hall has been extended 30 feet in length, the old weatherboarding covering the walls removed, a new floor laid, and walls and ceiling ceiled with beaded ceiling, covered with two coats of oil filler and one coat of hard oil finish. The kitchen has been refloored, the plastering, or what remained of it, replaced with ceiling as in the hall; the sink has been reset, the old closet removed and replaced by shelving, and many minor alterations made. A new dining room and a bathroom have been added, bath tub, closet, sink, and lavatories put in, all connected with the sewers and provided with hot and cold water connections. A portion of the work was done by contract, a portion by the station force. Some material was bought and some taken from other places about the reservation where it was not needed. The total cost has been \$821.23. A range has been purchased; cost, \$94.86.

Hospital at Evansville, Ind. (erected 1891).—P. A. Surg. James H. Oakley gives the following report of repairs and improvements at this hospital station:

Conduit for steam pipes to surgeon's residence, \$1,420; new flagstaff, iron, \$104; hot-water tank, south ward, \$157. A retaining wall has been constructed on the north side of the reservation to protect the building, at a cost of \$5,475.10; miscellaneous minor repairs, \$141.36.

Under the head of improvements or unusual repairs for the ensuing year, for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Extension of the stone wall along the northern part of the reservation, \$5,000; carriage shed, \$500.

Under the head of ordinary repairs required during the ensuing fiscal year, which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Painting roofs, repairing brick arches, renewal of plasterwork, and painting internal walls and ceilings; estimated cost, \$600.

Hospital at Key West, Fla. (erected 1840).—P. A. Surg. G. M. Guitéras makes the following report of repairs and improvements at this hospital station:

Addition to hospital steward's quarters, \$320; repairs to old portion of same, \$148; repairs to sea wall, \$585; quarters for attendants and storehouse (new), \$445; installation of electric lights, \$71.78; miscellaneous minor repairs, \$145.

Under the head of improvements or unusual repairs for the ensuing year, for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Fences around reservation, 632 feet (estimated at \$1,550).

Hospital at Louisville, Ky. (erected 1852).—P. A. Surg. W. P. McIntosh makes the following report of repairs and improvements at this hospital station:

Extensive repairs have been undertaken at this station. The entire basement, with the exception of the coal cellars, has been newly floored with Portland cement, and laths and plastering on walls and ceiling of entire basement have also been renewed. The plastering on the area walls has been replaced with a coat of Portland cement. New doors and frames have been supplied for the basement. A dumb-waiter, with speaking tube, running from the first to the third floor, has been placed. The entire plumbing in the surgeon's quarters has been renewed, and three new closets and tanks on the second and the same on the third floor have been added. Three new floors have been laid in the steward's quarters, and the tin roof of building thoroughly repaired. Windows, frames, casings, and shutters throughout have been repaired or replaced and painted. All outside woodwork of the building has been painted, and a new iron gate placed at the entrance of driveway on Portland avenue. The cost of this work was \$2,837.30. The operating room has been enlarged, and marble floor laid to replace the old wooden floor, and a new skylight, at a cost of \$341. The dispensary has been enlarged and improved, and marble floor laid, and equipment for same completed, at a cost of \$563.05; water filter, \$250; miscellaneous minor repairs have been completed at a cost of \$356.10; repairs and improvements have been made by hospital attendants, at a cost of material only, in amount, \$167.63. The president of the park commissioners donated fifty sugar maple trees, which were planted on the new driveway leading from Portland avenue. This driveway was entirely constructed by hospital attendants, and is made with cinders on a foundation of broken stone and brick.

Under the head of improvements and unusual repairs for the ensuing fiscal year, for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Painting the outside of all buildings on the reservation, \$2,000; residence for medical officer, \$6,000; iron fences and stone foundation, \$2,500; Schillinger pavement, \$250.

Under the head of ordinary repairs required during the fiscal year, which may be chargeable to the appropriation "Repairs and preservation of marine hospitals," the medical officer in command recommends the following as necessary: Raising and draining stable and placing new floor in same, \$275; draining grounds, \$50 (for material); repairs to plumbing, \$100; miscellaneous repairs, \$150.

Hospital at Memphis, Tenn. (erected 1885).—P. A. Surg. G. M. Magruder makes the following report of repairs and improvements at this hospital station:

Concrete floor in basement of executive building, \$90; improvements in operating room, \$320; repairs to roofs, \$257; miscellaneous minor repairs, plumbing, fences, walks, etc., \$303.03.

Under the head of improvements or unusual repairs for the ensuing fiscal year for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Retaining wall on north and south sides of reservation, \$15,000.

Under the head of ordinary repairs required during the ensuing fiscal year which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Repairs to outside woodwork—porches, verandas, cupola, etc., \$800; additional room, 24 by 20 feet, for tool shop, \$300; partition wall, surgeon's quarters (parlor), \$65; partition wall, dispensary, to provide laboratory and dark room, \$200; barbed-wire and picket fence (1,400 feet), \$500; painting buildings entire, \$2,500; repairing and plastering, \$150; minor repairs, \$50.

Hospital at Mobile, Ala. (erected 1843).—Surg. R. D. Murray makes the following report of repairs and improvements at this hospital station:

Miscellaneous minor repairs of a character not necessary to specify, \$72.75.

Congress having made an appropriation of \$5,000 for general improvements to the station, the matter has been referred to the Supervising Architect, and no estimates for unusual repairs will be made until the amount appropriated by Congress has been expended.

Hospital at New Orleans, La. (erected 1885).—Surg. H. R. Carter makes the following report of repairs and improvements at this hospital station:

Repairing kitchen floor, \$85; repairing fireplaces, \$68; repairing piazza roofs, \$297; 3 cisterns, laundry, kitchen, and wards, \$322.50; Schillinger concrete walks, \$222; extension of main sewer to river, \$1,675; new water pump, \$297.60. Miscellaneous minor repairs have been done at a total cost of \$147.40. Repairs have been performed by hospital attendants at a cost of material to the amount of \$262.53.

Under the head of improvements or unusual repairs for the ensuing fiscal year for which a special appropriation must be made, the medical officer in command reports the following needed improvements: New surgical operating amphitheater, \$3,000.

Under the head of ordinary repairs required during the ensuing fiscal year which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Repairs to outbuildings used as storage rooms on the reservation, \$600; additions to piazza, second story surgeon's residence, \$580; auxiliary boiler, power house, \$700; storage battery, electric-light plant, \$500; repairs to plumbing, 3 wards, \$1,000; painting exterior of station, \$2,000; repairs to stable, \$300; relaying brick pavement, \$900; miscellaneous repairs to roofs, chimneys, laundry apparatus, etc., \$840.

Hospital at Portland, Me. (erected 1859).—Surg. F. W. Mead makes the following report of repairs and improvements at this hospital station:

Improvements in operating room, \$410; repairs to plumbing, \$128.19; miscellaneous minor repairs, \$138.84. Painting and repairs to woodwork have been performed at a cost of material only.

Under the head of improvements or unusual repairs for the ensuing fiscal year for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Improvement of grounds, \$1,000.

Under the head of repairs chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command states that the following repairs will be necessary: Painting exterior of the hospital, \$500, and placing a new floor in the wagon room of the stable, \$250.

Hospital at Port Townsend, Wash. (erected 1895).—P. A. Surg. J. C. Perry makes the following report of repairs and improvements at this hospital station:

Steam-heating and ventilating apparatus has been installed at a cost of \$4,100; automatic water heater, \$430; drainage of grounds, \$545; miscellaneous minor repairs, \$32.75.

Under the head of improvements or unusual repairs for the ensuing fiscal year for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Fence about reservation, \$1,200; new mortuary, \$500.

Under the head of ordinary repairs required during the ensuing fiscal year which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Improvements to operating room, new tile floor and partitions, \$427; repairs to officers' ward for use of the Revenue-Cutter Service, \$262; repairs to plumbing, \$425; painting and varnishing floors (2,367 square yards), \$281.64; electric-bell system, \$200; repairs to plastering, \$150; concreting floor of boiler room, \$50.

Hospital at San Francisco, Cal. (erected 1875).—Surg. J. M. Gassaway makes the following report of repairs and improvements at this hospital station:

Four attendants have been continuously employed for ten and one-half months in painting, scraping, burning, and sandpapering the surfaces of executive building, kitchen and dining-room building, officers and attendants' quarters, Wards A, B, and D, pumping station, and stable. Interior work has also been performed by attendants in painting a large portion of the same buildings. The dispensary was remodeled and repaired throughout. The bacteriological laboratory has been fitted up in Ward B, and the new surgical operation room has been installed and equipped in Ward D. A large amount of minor repairs was performed on the heating and ventilating apparatus and on the walls and floors of the various buildings by hospital attendants, at a cost of material only. The executive building has been raised and placed upon a secure foundation, the old supporting walls rebuilt, and decayed timber removed, at a cost of \$735. Similar work has been done on the kitchen at a cost of \$225. Miscellaneous minor repairs have been performed under contract at a total cost of \$370.98.

Under the head of ordinary repairs required during the ensuing fiscal year which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Material for continuation of painting buildings, \$1,500; storerooms for drugs, etc., executive building, \$500; rearrangement of stewards and internes' quarters with respect to plumbing to secure adequate conveniences for these officers, \$350; partition to make special ward for officers of the Revenue-Cutter Service, \$250; lumber for renovating floors and walls, \$600; repairs to steam-heating apparatus, \$100; smoke consumers for heating plant, \$300; electric-bell system, \$100.

Hospital at St. Louis, Mo. (erected 1885).—P. A. Surg. W. G. Stimpson, in temporary command, makes the following report of repairs and improvements at this hospital station:

Repairs to boiler-house and boilers, \$449.10; kitchen range, \$92; new water-closet, \$32.

Under the head of improvements or unusual repairs for the ensuing fiscal year, for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Iron fence with stone coping along the front of the reservation, 900 feet, \$5,000; wooden fence on remaining sides, 2,220 feet, \$900.

Under the head of ordinary repairs required during the ensuing fiscal year, which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Renewal of plumbing in wards and tiling floors in water-closets, \$1,600; repairs to operating room, including tiling of floor and walls, \$400; gas fixtures, \$63; tin roof, \$180; repairs to mortuary, \$150; repairs to plastering, \$88; miscellaneous minor repairs, \$200.

Hospital at Vineyard Haven, Mass. (erected 1895).—Asst. Surg. John McMullen makes the following report of repairs and improvements at this hospital station:

Repairs and improvements to the old executive building, for the purpose of furnishing quarters to attendants, have been completed at a cost of \$670; miscellaneous minor repairs have been made by the attendants, at a cost of material only, in amount \$116.20.

Under the head of improvements or unusual repairs for the ensuing fiscal year, for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Improvement of grounds, \$1,000.

Hospital at Wilmington, N. C. (erected 1859).—P. A. Surg. C. P. Wertenbaker makes the following report of repairs and improvements at this hospital station:

A new hospital building, one story and a half with basement, has been completed and opened for the reception of patients. This building contains a ward for white patients and another for colored patients, the two being capable of holding 35 beds, a dispensary and an office, a dining room, pantry, kitchen, linen closet, surgical operating room, and necessary lavatories. This hospital building was put in commission on May 25, 1898, and the patients moved from the old wards in the executive buildings. The new structure still needs complete heating and lighting arrangements, a portion of which has been provided. The cost of this building was \$6,887. A small isolation ward for cases of contagious disease has also been completed. It is capable of containing 12 beds; cost, \$1,176. The grounds have been graded and a fence erected in front of the hospital, at a cost of \$185. Repairs to stable, \$125; plumbing, \$215; fitting of dispensary, \$120.

Under the head of ordinary repairs required during the ensuing fiscal year which may be chargeable to the appropriation "Repairs and preservation of marine hospitals, 1900," the medical officer in command recommends the following as necessary: Renewal of plumbing in executive building, \$800; painting interior of same and renewing plastering, \$500.

Under the head of improvements or unusual repairs for the ensuing fiscal year, for which a special appropriation must be made, the medical officer in command reports the following needed improvements: Completing second story of new ward building, \$500; building for laundry, \$1,500; new steam laundry plant, \$1,000.

CARE OF SEAMEN.

The provisions made for the care of seamen for the fiscal year ending June 30, 1899, at all ports where relief is furnished, are set forth in the following circular:

CONTRACTS FOR CARE OF SEAMEN, ETC.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL U. S. M. H. S.,
Washington, D. C., June 6, 1898.

The following contracts for the care of seamen entitled to relief from this Service for the fiscal year ending June 30, 1899, are published for the information of accounting officers of the Treasury Department, disbursing agents, commissioned

medical officers and acting assistant surgeons of the Marine-Hospital Service, and custom officers. This circular is to be regarded as official notification of the acceptance of the proposals made by the parties designated, and must be cited, giving its number and date, on all bills for the treatment and maintenance of seamen, and for the burial of deceased hospital patients, as the authority for any expenditure incurred under its provisions. Charges will be allowed for the day of admission of a hospital patient, but not for the day of discharge or death. The right is reserved by the Secretary of the Treasury to terminate any contract whenever the interests of the Service require it. All relief must be furnished in accordance with revised regulations of the Marine-Hospital Service; and, in consequence of the large expenditure for relief, and of the limited sources of income, it has become necessary to give notice that, as provided in the regulations, no allowance will be made for expenditures incurred at any station not named in this circular.

Upon admission to a contract hospital of a patient with disease or injury which, in the opinion of the medical officer, the acting assistant surgeon, or physician in charge of the case, will require more than twenty days' treatment in hospital, the officer issuing the permit will at once request authority from the Bureau to transfer such patient to the nearest marine hospital, provided the patient's condition, in the opinion of the medical officer, the acting assistant surgeon, or physician in charge of the case, is such as to admit of transportation.

The attention of customs officers, commissioned medical officers, acting assistant surgeons, or other physicians in charge of patients of the Marine-Hospital Service at contract stations, is hereby called to the necessity of discharging patients promptly upon the termination of the necessary hospital treatment, and without awaiting the expiration of the period authorized in the permit.

The term "contagious diseases" wherever occurring in this circular, specific contracts excepted, includes only those diseases which, under usual municipal regulations, are required to be treated in a special hospital for contagious diseases.

WALTER WYMAN,

Supervising Surgeon-General U. S. Marine-Hospital Service.

Approved:

L. J. GAGE, *Secretary of the Treasury.*

Albany, N. Y.—The medical attendance to be furnished by an acting assistant surgeon; Albany Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 a day; Martin E. Naugh to provide for the burial of deceased patients, at \$15 each.

Apalachicola, Fla.—Dr. J. D. Rush to furnish medical attendance and medicines, at \$30 a month; Martha Campbell to furnish quarters, subsistence, and nursing, at \$1 a day, and to provide for the burial of deceased patients, at \$15 each.

Ashland, Wis.—St. Joseph's Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at 85 cents a day; contagious diseases, \$2 a day, and to provide for the burial of deceased patients, at \$9 each.

Ashtabula, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; Mrs. Henry Whelpley to furnish quarters, subsistence, and nursing, at \$1 a day; contagious diseases, \$1.50 a day; John Ducro & Sons to provide for the burial of deceased patients, at \$9.75 each.

Astoria, Oreg.—The medical attendance to be furnished by an acting assistant surgeon; St. Marys Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 a day.

Baltimore, Md.—Hospital patients to be cared for in the United States Marine Hospital; Albert F. Philbin to provide for the burial of deceased patients, at \$16 each.

Bangor, Me.—The medical attendance to be furnished by an acting assistant surgeon; Helen M. Stratton to furnish quarters, subsistence, and nursing, at \$1 a day; Abel Hunt to provide for the burial of deceased patients, at \$10 each.

Bath, Me.—The medical attendance to be furnished by an acting assistant surgeon. Patients requiring hospital treatment will, if able to bear transportation, be sent to the marine hospital at Portland, Me.

Beaufort, N. C.—The medical attendance to be furnished by an acting assistant surgeon; Charles L. Duncan to furnish quarters, subsistence, and nursing, at \$1 a day, and to provide for the burial of deceased patients, at \$15 each.

Bismarck, N. Dak.—The medical attendance to be furnished by an acting assistant surgeon; Lamborn Hospital to furnish quarters, subsistence, and nursing, at 90 cents a day; contagious diseases, at \$2 a day.

Boston, Mass.—Hospital patients to be cared for in the United States marine hospital at Chelsea, Mass.; burial of deceased patients at the hospital cemetery; burial of foreign patients, at \$10 each.

Bridgeport, Conn.—Bridgeport Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$1 a day.

Brownsville, Tex.—The medical attendance to be furnished by an acting assistant surgeon.

Brunswick, Ga.—The medical attendance to be furnished by an acting assistant surgeon; Johanna Foley to furnish quarters, subsistence, and nursing, at 90 cents a day; contagious diseases, at \$2 a day; Charles G. Moore to provide for the burial of deceased patients, at \$15 each.

Buffalo, N. Y.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; Buffalo Hospital (Sisters of Charity) to furnish quarters, subsistence, nursing, and medicines, at \$1 a day; contagious diseases, at \$2 a day; and to provide for the burial of deceased patients, at \$10 each.

Burlington, Iowa.—Mercy Hospital to furnish quarters, subsistence, medical attendance, nursing, and medicines, at 85 cents a day; contagious diseases, at \$1 a day; I. Prugh & Sons to provide for the burial of deceased patients, at \$15 each.

Cairo, Ill.—Hospital patients to be cared for in the United States Marine Hospital; L. E. Falconer to provide for the burial of deceased patients, at \$5.35 each.

Cambridge, Md.—The medical attendance to be furnished by an acting assistant surgeon; Dorothy Cornish to furnish quarters, subsistence, and nursing, at 60 cents a day.

Charleston, S. C.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; St. Francis Xavier's Infirmary to furnish quarters, subsistence, nursing, and medicines, at 95 cents a day; contagious diseases, at \$2 a day; and to provide for the burial of deceased patients, at \$12 each.

Chattanooga, Tenn.—The medical attendance to be furnished by an acting assistant surgeon; Hamilton County Hospital to furnish quarters, subsistence, nursing, and medicines, at 60 cents a day; contagious diseases, at \$2 a day; J. Long to provide for the burial of deceased patients, at \$15 each.

Chicago, Ill.—Hospital patients to be cared for in the United States Marine Hospital; B. E. Arutzen to provide for the burial of deceased patients, at \$15 each.

Cincinnati, Ohio.—Hospital patients to be cared for in the United States Marine Hospital; dispensary at the hospital, southeast corner of Third and Kilgour streets; P. Gilligan & Sons to provide for the burial of deceased patients, at \$12.90 each.

Cleveland, Ohio.—Hospital patients to be cared for in the United States Marine Hospital; Flynn, Abel & Froelk to furnish ambulance service, at \$1 for each patient, and Hogan & Sharer to provide for the burial of deceased patients, at \$13 each.

Corpus Christi, Tex.—The medical attendance to be furnished by an acting assistant surgeon; James E. Ellis to furnish quarters, subsistence, and nursing, at \$1 a day; Corpus Christi Livery Company to provide for the burial of deceased patients, at \$15 each.

Darien, Ga.—The medical attendance to be furnished by an acting assistant surgeon.

Deuware Breakwater, Del.—Hospital patients to be cared for in the United States Marine Hospital.

Detroit, Mich.—Hospital patients to be cared for in the United States Marine Hospital; Charles N. Flattery to provide for the burial of deceased patients, at \$8.50 each.

Dubuque, Iowa.—The medical attendance to be furnished by an acting assistant surgeon; St. Joseph's Mercy Hospital to furnish ambulance service, quarters, subsistence, nursing, and medicines, at 80 cents a day; John A. Voelker to provide for the burial of deceased patients, at \$10 each.

Duluth, Minn.—The medical attendance to be furnished by an acting assistant surgeon; St. Luke's Hospital to furnish quarters, subsistence, nursing, and medicines, at 75 cents a day; John W. Stewart to provide for the burial of deceased patients, at \$15 each.

Edenton, N. C.—R. Dillard, M. D., to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$2 a day. For out-patients \$1 will be allowed for each medical examination, and 25 cents additional for each time medicine is furnished; L. F. Ziegler to provide for the burial of deceased patients, at \$11.50 each.

Elizabeth City, N. C.—The medical attendance to be furnished by an acting assistant surgeon.

Ellsworth, Me.—The medical attendance to be furnished by an acting assistant surgeon. Patients requiring hospital treatment will, if able to bear transportation, be sent to the marine hospital at Portland, Me.

Erie, Pa.—The medical attendance to be furnished by an acting assistant surgeon; Hamot Hospital Association to furnish quarters, subsistence, nursing, and medicines, at 71 cents a day; V. Heidt to provide for the burial of deceased patients, at \$15 each.

Escanaba, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Delta County Hospital to furnish quarters, subsistence, and nursing, at 86 cents a day.

Eureka, Cal.—The medical attendance to be furnished by an acting assistant surgeon; Maria Anderson to furnish quarters, subsistence, nursing, and medicines, at \$1 a day; F. F. Pierce to provide for the burial of deceased patients, at \$13 each.

Evansville, Ind.—Hospital patients to be cared for in the United States Marine Hospital; William Abele to provide for the burial of deceased patients, at \$10.75 each.

Fernandina, Fla.—The medical attendance to be furnished by an acting assistant surgeon; A. G. Webster to furnish quarters, subsistence, and nursing, at \$1 a day; contagious diseases, at \$2 a day.

Fredericksburg, Va.—The medical attendance to be furnished by an acting assistant surgeon; Amelia Parrott to furnish quarters, subsistence, and nursing, at 90 cents a day; contagious diseases, at \$2 a day; George Nossett to provide for the burial of deceased patients, at \$12.50 each.

Gallipolis, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; Harriet J. Kinder to furnish quarters, subsistence, and nursing, at 80 cents a day; contagious diseases, \$1 a day; and to provide office quarters for the acting assistant surgeon, at \$10 a month. Patients who require hospital treatment and whose condition, in the opinion of the acting assistant surgeon, will permit

their transportation with perfect safety, shall be sent to the marine hospital at Cincinnati, Ohio.

Galveston, Tex.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; St. Mary's Infirmary to furnish ambulance service, quarters, subsistence, nursing, and medicines, at \$1 a day; contagious diseases, at \$2 a day; and to provide for the burial of deceased patients, at \$10 each.

Georgetown, S. C.—The medical attendance to be furnished by an acting assistant surgeon. Patients requiring hospital treatment will, if able to bear transportation, be sent to the marine hospital at Wilmington, N. C.

Gloucester, Mass.—The medical attendance to be furnished by an acting assistant surgeon; Addison Gilbert Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 a day. Patients requiring hospital treatment will, if able to bear transportation, be sent to the marine hospital at Boston, Mass.

The Government Hospital for the Insane, District of Columbia—Under act of Congress, March 3, 1875, to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$4.50 a week, for each insane patient admitted upon the order of the Secretary of the Treasury.

Grand Haven, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Anna Farnham to furnish quarters, subsistence, and nursing, at \$1 a day; A. Kiel to provide for the burial of deceased patients, at \$14 each.

Hartford, Conn.—The Hartford Hospital to furnish quarters, subsistence, nursing, medical attendance, and medicines, at \$1 a day; G. W. Woolley & Son to provide for the burial of deceased patients, at \$13 each.

Jacksonville, Fla.—The medical attendance to be furnished by an acting assistant surgeon: Mrs. Eugenie Barr to furnish quarters, subsistence, and nursing, at \$1 a day; Clark & Burns Company to provide for the burial of deceased patients, at \$3.90 each.

Juneau, Alaska.—The medical attendance to be furnished by an acting assistant surgeon; St. Ann's Hospital to furnish quarters, subsistence, nursing, and medicines, at \$2 a day.

Key West, Fla.—Hospital patients to be cared for in the United States Marine Hospital; Otto & Boza to provide for the burial of deceased patients, at \$10 each.

La Crosse, Wis.—The medical attendance to be furnished by an acting assistant surgeon; St. Francis' Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 a day.

Little Rock, Ark.—The medical attendance to be furnished by an acting assistant surgeon; Little Rock Infirmary to furnish quarters, subsistence, nursing, and medicines, at \$1 a day; Jas. Cook & Co. to provide for the burial of deceased patients, at \$8.50 each.

Louisville, Ky.—Hospital patients to be cared for in the United States Marine Hospital; Hill & Co. to provide for the burial of deceased patients, at \$13 each.

Ludington, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Mrs. H. D. Linsley to furnish quarters, subsistence, and nursing, at 80 cents a day; Ludington Casket Company to provide for the burial of deceased patients, at \$14.98 each.

Machias, Me.—The medical attendance to be furnished by an acting assistant surgeon; S. W. Hill to furnish quarters, subsistence, and nursing, at \$1 a day; L. H. Hanscom to provide for the burial of deceased patients, at \$12 each.

Munistee, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Mercy Hospital to furnish quarters, subsistence, nursing, and medicines, at 90 cents a day; Switzer & Merkle to provide for the burial of deceased patients, at \$10.50 each.

Marquette, Mich.—The medical attendance to be furnished by an acting assistant surgeon; St. Mary's Hospital to furnish quarters, subsistence, nursing, and medicines, at 75 cents a day, and to provide for the burial of deceased patients, at \$6.45 each.

Marshfield, Oreg.—The medical attendance to be furnished by an acting assistant surgeon; John Snyder to furnish quarters, subsistence, nursing, and medicines, at \$1.20 a day.

Memphis, Tenn.—Hospital patients to be cared for in the United States Marine Hospital; E. D. Thompson & Co. to provide for the burial of deceased patients, at \$6 each.

Milwaukee, Wis.—The medical attendance to be furnished by an acting assistant surgeon; St. Mary's Hospital to furnish quarters, subsistence, nursing, and medicines, at 80 cents a day; George L. Thomas to provide for the burial of deceased patients, at \$15 each. Patients who require hospital treatment and whose condition, in the opinion of the acting assistant surgeon, will permit their transportation with perfect safety, shall be sent to the Marine Hospital at Chicago, Ill.

Mobile, Ala.—Hospital patients to be cared for in the United States Marine Hospital; Bérroujon, Sands & Co. to provide for the burial of deceased patients, at \$11.80 each.

Nashville, Tenn.—The medical attendance to be furnished by an acting assistant surgeon; Nashville City Hospital to furnish quarters, subsistence, nursing, and medicines, at 90 cents a day; W. R. Cornelius & Co. to provide for the burial of deceased patients, at \$11 each.

New Bedford, Mass.—The medical attendance to be furnished by an acting assistant surgeon; patients requiring hospital care and treatment, if able to bear transportation, will be sent to the United States Marine Hospital at Vineyard Haven, Mass.

Newbern, N. C.—The medical attendance to be furnished by an acting assistant surgeon; Susan A. Collins to furnish quarters, subsistence, and nursing, at \$1 a day; H. W. Simpson to provide for the burial of deceased patients, at \$15 each.

New Haven, Conn.—The medical attendance to be furnished by an acting assistant surgeon; The General Hospital Society of Connecticut to furnish quarters, subsistence, nursing, and medicines, at \$1 a day; and to provide for the burial of deceased patients, at \$15 each.

New London, Conn.—The medical attendance to be furnished by an acting assistant surgeon; Memorial Hospital Association to furnish quarters, subsistence, nursing, and medicines, at \$1.50 a day; Caulkins & Prentiss to provide for the burial of deceased patients, at \$13.50 each. Patients requiring hospital treatment will, if able to bear transportation, be sent to the Marine Hospital at Stapleton, N. Y.

New Orleans, La.—Hospital patients to be cared for in the United States Marine Hospital; Jos. J. McMahon Co. to provide for the burial of deceased patients, at \$8.50 each.

Newport, Ark.—The medical attendance to be furnished by an acting assistant surgeon; L. C. Coxey to furnish quarters, subsistence, and nursing, at \$1 a day; R. F. Drummond to provide for the burial of deceased patients, at \$10 each.

Newport, R. I.—The medical attendance to be furnished by an acting assistant surgeon; Newport Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 a day; John S. Langley to provide for the burial of deceased patients, at \$15 each.

Newport News, Va.—The medical attendance to be furnished by an acting assistant surgeon. Patients requiring hospital treatment will, if able to bear transportation, be sent to the Marine Hospital at Baltimore, Md.

New York, N. Y.—Hospital patients to be cared for in the Marine Hospital, Stapleton, Staten Island, N. Y.; John T. Oates to provide for the burial of deceased patients, at \$13.50 each.

Norfolk, Va.—The medical attendance to be furnished by a medical officer of the Marine Hospital Service; St. Vincent's Hospital to furnish quarters, subsistence, nursing, ambulance service, and medicines, at 85 cents a day; A. E. Hall & Co. to provide for the burial of deceased patients, at \$12.50 each.

Ogdensburg, N. Y.—The medical attendance to be furnished by an acting assistant surgeon; City Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 a day; Nutall & Murphy to provide for the burial of deceased patients, at \$9.23 each.

Oswego, N. Y.—The medical attendance to be furnished by an acting assistant surgeon; Oswego Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 a day; John F. Dain & Son to provide for the burial of deceased patients, at \$15 each.

Pensacola, Fla.—The medical attendance to be furnished by an acting assistant surgeon; Anderson & Renshaw to furnish quarters, subsistence, nursing, and medicines, at \$1 a day; contagious diseases, \$2 a day.

Philadelphia, Pa.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; German Hospital to furnish ambulance service, quarters, subsistence, nursing, medicines, and one interne, at \$1 a day, and to provide for the burial of deceased patients, at \$15 each.

Pittsburg, Pa.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; Mercy Hospital to furnish quarters, subsistence, nursing, medicines, and a resident physician, at 94 cents a day, and \$2 a day for contagious diseases; Burns & Giltinan to provide for the burial of deceased patients, at \$13 each.

Port Huron, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Port Huron Hospital and Home to furnish quarters, subsistence, and nursing, at \$1 a day; George Thompson to provide for the burial of deceased patients, at \$5.75 each.

Portland, Me.—Hospital patients to be cared for in the United States Marine Hospital; Ilsley Brothers to provide for burial of deceased patients, at \$11 each.

Portland, Oreg.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; St. Vincent's Hospital to furnish quarters, subsistence, nursing, and medicines, at 80 cents a day; contagious diseases, at \$2 a day; F. S. Dunning to provide for the burial of deceased patients, at \$4.45 each.

Portsmouth, N. H.—The medical attendance to be furnished by an acting assistant surgeon; Cottage Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 a day; Oliver W. Ham to provide for the burial of deceased patients, at \$15 each.

Port Tampa, Fla.—The medical attendance to be furnished by an acting assistant surgeon; R. F. Altree to furnish quarters, subsistence, and nursing, at \$1 a day.

Port Townsend, Wash.—Hospital patients to be cared for in the United States Marine Hospital; Port Townsend Undertaking Company to provide for the burial of the deceased patients, at \$16 each.

Providence, R. I.—The medical attendance to be furnished by an acting assistant surgeon; Martha Wood to furnish quarters, subsistence, and nursing, at \$1.50 a day. Patients who require hospital treatment and whose condition, in the opinion of the acting assistant surgeon, will permit their transportation with perfect safety, will be sent to the Marine Hospital at Boston, Mass.

Richmond, Va.—The medical attendance to be furnished by an acting assistant surgeon; "Retreat for the Sick" Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 a day; James McDonough & Co. to provide for the burial of deceased patients, at \$15 each.

Rockland, Me.—The medical attendance to be furnished by an acting assistant surgeon. Patients requiring hospital treatment will, if able to bear transportation, be sent to the Marine Hospital at Portland, Me.

Saginaw, Mich.—The medical attendance to be furnished by an acting assistant surgeon; St. Mary's Hospital to furnish quarters, subsistence, nursing, and medicines, at 90 cents a day; contagious diseases, at \$2 a day.

St. Louis, Mo.—Hospital patients to be cared for in the United States Marine Hospital; J. H. Gebken to provide for the burial of deceased patients, at \$11.50 each.

St. Paul, Minn.—The medical attendance to be furnished by an acting assistant surgeon; St. Luke's Hospital to furnish quarters, subsistence, nursing, and medicines, at \$1 a day, and to provide for the burial of deceased patients, at \$4.50 each.

San Diego, Cal.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; Nonsectarian Hospital to furnish quarters, subsistence, nursing, and ambulance service, at \$1 a day; W. W. Whitson & Co. to provide for the burial of deceased patients, at \$13.50 each.

Sandusky, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; Good Samaritan Hospital to furnish quarters, subsistence, and nursing, at \$1 a day.

San Francisco, Cal.—Hospital patients to be cared for in the United States Marine Hospital; burial of deceased patients at the hospital cemetery; burial of foreign seamen, at \$10 each.

San Pedro, Cal.—Ira E. Coe, M. D., to furnish quarters, subsistence, nursing, medical attendance, and medicines, at 90 cents a day; contagious diseases at \$1.50 a day, and to provide for the burial of deceased patients at \$10 each.

Sault Ste. Marie, Mich.—The medical attendance to be furnished by an acting assistant surgeon; Mrs. Annie Little to furnish quarters, subsistence, and nursing at \$1 a day; Ryan & Co. to provide for the burial of deceased patients at \$14 each.

Savannah, Ga.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; St. Joseph's Infirmary to furnish quarters, subsistence, nursing, and medicines at \$1 a day; contagious diseases at \$2 a day; Thomas Henderson's Sons to provide for the burial of deceased patients at \$11 each.

Seattle, Wash.—The medical attendance to be furnished by an acting assistant surgeon; Providence Hospital to furnish quarters, subsistence, nursing, and medicines at 75 cents a day; Bonney & Stewart to provide for the burial of deceased patients at \$3.40 each. Patients requiring hospital treatment will, if able to bear transportation, be sent to the marine hospital at Port Townsend, Wash.

Shreveport, La.—The medical attendance to be furnished by an acting assistant surgeon; the Shreveport Sanatorium to furnish quarters, subsistence, nursing, and medicines at 95 cents a day; the Shreveport Undertaking Company to provide for the burial of deceased patients at \$15.50 each.

Solomons, Md.—The medical attendance to be furnished by an acting assistant surgeon; M. F. Morrison to furnish subsistence, nursing, fuel, and lights at \$1 a day; T. M. White to provide for the burial of deceased patients at \$8 each.

Sturgeon Bay, Wis.—The medical attendance to be furnished by an acting assistant surgeon; Moeller & Schmidt to furnish quarters, subsistence, and nursing at \$1 a day; H. J. Hahn to provide for the burial of deceased patients at \$13 each.

Superior, Wis.—The medical attendance to be furnished by an acting assistant surgeon; St. Mary's Hospital to furnish quarters, subsistence, nursing, and medicines at 90 cents a day; A. P. La Sage to provide for the burial of deceased patients at \$8 each.

Tacoma, Wash.—The medical attendance to be furnished by an acting assistant surgeon; Fannie C. Paddock Memorial Hospital to furnish quarters, subsistence, nursing, and medicines at 60 cents a day; Conrad L. Hoska to provide for the burial of deceased patients at \$9.50 each.

Tappahannock, Va.—W. G. Jeffries, M. D., to furnish quarters, subsistence, nursing, medical attendance, and medicines at Tappahannock; Dr. W. J. Newbill, at Carters Creek, and Dr. W. S. Christian, at Urbana, each at \$1.50 a day.

Toledo, Ohio.—The medical attendance to be furnished by an acting assistant surgeon; Toledo Hospital Association to furnish quarters, subsistence, nursing, and medicines, at 80 cents a day; contagious diseases at \$1.50 a day, and to provide for the burial of deceased patients at \$15 each.

Vicksburg, Miss.—The medical attendance to be furnished by an acting assistant surgeon; Vicksburg City Hospital to furnish quarters, subsistence, nursing, and medicines at \$1 a day; Frank J. Fisher & Co. to provide for the burial of deceased patients, at \$12 each.

Vineyard Haven, Mass.—Hospital patients to be cared for in the United States Marine Hospital; Hinckley & Renear to provide for the burial of deceased patients at \$10 each.

Washington, D. C.—The medical attendance to be furnished by a medical officer of the Marine-Hospital Service; Providence Hospital to furnish quarters, subsistence, nursing, interne attendance, and medicines, at 75 cents a day, and to provide for the burial of deceased patients at \$15 each.

Wheeling, W. Va.—The medical attendance to be furnished by an acting assistant surgeon; Wheeling Hospital to furnish quarters, subsistence, nursing, and medicines, at 75 cents a day.

Wilmington, N. C.—Hospital patients to be cared for in the United States Marine Hospital; D. C. Evans to provide for the burial of deceased patients at \$9 each.

At the following-named ports the rate for quarters, subsistence, and nursing will in each special case be fixed by the Bureau, upon the recommendation of the proper officer, in accordance with the Regulations of the Marine-Hospital Service, paragraph 447:

Bath, Me.; Brownsville, Tex.; Darien, Ga.; Elizabeth City, N. C.; Ellsworth, Me.; Georgetown, S. C.; New Bedford, Mass.; Newport News, Va.; Rockland, Me.

At the following named ports hospital or other relief will be furnished only under the provisions of the regulations of the Marine-Hospital Service, paragraphs 408, 410, 446, and 613:

Barnstable, Mass.; Beaufort, S. C.; Belfast, Me.; Burlington, Vt.; Castine, Me.; Cedar Keys, Fla.; Chatham, Mass.; Dennis, Mass.; Eastport, Me.; Edgartown, Mass.; Hyannis, Mass.; Perth Amboy, N. J.; Provincetown, Mass.; Sag Harbor, N. Y.; Salem, Mass.; Sitka, Alaska.; Somers Point, N. J.; Waldoboro, Me.; Wilmington, Del.; Wiscasset, Me.

The United States marine hospitals are, by the provisions of Department Circular No. 73, May 2, 1898, made available for the reception of the sick and wounded of either the United States Army or the United States Navy, and commissioned medical officers in command of United States marine hospitals are hereby directed, upon written request of the proper military or naval authority, to receive and care for said patients: the Marine-Hospital Service to be reimbursed the actual cost of maintenance.

The rate of charge for seamen from vessels of the Coast Survey, admitted to hospital under the provisions of the Regulations, and of foreign seamen admitted under the act of March 3, 1875, is hereby fixed at the uniform rate of \$1 a day.

At all ports not otherwise specified the dispensary is located at the custom-house or marine hospital.

CIRCULAR LETTERS RELATIVE TO ADMINISTRATIVE DETAILS.

The following circular letters have been issued by the Bureau during the past year to officers of the Service and others relating to administrative details:

LEAVES OF ABSENCE—ACTING ASSISTANT SURGEONS.

TREASURY DEPARTMENT.

OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,

*Washington, D. C., July 12, 1897.**To Acting Assistant Surgeons, United States Marine-Hospital Service:*

Your attention is called to paragraphs 36-40, Revised Regulations, Marine-Hospital Service, 1889, relative to leaves of absence. It becomes necessary to call the attention of acting assistant surgeons to these requirements concerning leaves of absence, in consequence of occasional violations of the same. Officers of this grade are required to strictly observe all the rules governing leaves, and requests for same, and notification of changes in their post-office addresses during such absence. No absence from posts of duty is permissible without authority, and if a necessity for sudden departure arises the telegraph may be used, at your expense, to request authority for such absence. Information must also be given relative to names of substitutes who are to act during such authorized leave.

You are directed to acknowledge receipt of these instructions.

Respectfully, yours,

WALTER WYMAN,

Supervising Surgeon-General M. H. S.

REVISED REGULATIONS, COMMISSIONED OFFICERS, AND HOSPITAL STEWARDS.

TREASURY DEPARTMENT.

OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,

*Washington, D. C., December 10, 1897.**Medical Officers and Hospital Stewards of the United States Marine-Hospital Service:*

The following paragraphs of the Revised Regulations, approved November 29, and effective December 1, 1897, are published for your information:

59. Hospital stewards shall be divided into two grades, senior and junior, and original appointments shall be to the grade of junior hospital steward.

60. Promotions, according to seniority or merit, will be made after three years' service from the junior to the senior grade, after due examination on subjects connected with their official duties. * * *

70. The compensation of commissioned officers, when not provided for by statute, shall be fixed at a uniform annual rate for each rank as follows, viz: Surgeons shall receive \$2,500 per annum, passed assistant surgeons shall receive \$2,000 per annum, and assistant surgeons shall receive \$1,600 per annum; and after five years' service an additional compensation of 10 per cent on the annual salary for each five years' service shall be allowed commissioned officers above the rank of assistant surgeon, but the maximum rate shall in no case exceed 40 per cent. Said officers placed on "waiting orders" for a period longer than two months shall receive 75 per cent of the pay of their respective ranks while so placed.

73. The compensation of hospital stewards shall be at the following annual rates, viz: Senior hospital stewards shall receive \$720 per annum; junior hospital stewards shall receive \$600 per annum. At the expiration of five years' service they shall receive \$792 per annum, and at the expiration of ten years' service they shall receive \$864 per annum.

WALTER WYMAN,

Supervising Surgeon-General M. H. S.

EMPLOYMENT OF ATTENDANTS IN ACCORDANCE WITH CIVIL-SERVICE RULES.

TREASURY DEPARTMENT.

OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,

*Washington, D. C., February 7, 1898.**Medical Officers and others concerned:*

Referring to the accompanying letter from the Civil Service Commission, your attention is especially directed to that portion of the commission's letter of September 10, 1897, relative to attendants employed after May 6, 1896, the date of the Executive order placing hospital attendants in the classified civil service. In that letter it was explained that persons temporarily appointed to the position of hospital attendant are entitled to file their papers and compete with others; that it is desirable that they should do so; that if they are the best fitted of those who compete, the system of rating must necessarily show them to be so, and then they can be selected for permanent appointment.

In order that the temporary appointments of hospital attendants employed at your station may be made permanent, I return such applications as have been submitted from persons desiring such appointment, and you are therefore directed to rate them in the manner prescribed by the letter of instructions from the Civil Service Commission, and if found eligible to request that their appointments be made permanent.

Respectfully, yours,

WALTER WYMAN,

Supervising Surgeon-General, M. H. S.

CONCERNING UNIFORMS.

TREASURY DEPARTMENT.

OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,

*Washington, D. C., April 6, 1898.**Medical Officers and Hospital Stewards, United States Marine-Hospital Service:*

In order to conform to the Revised Regulations for the Government of the Marine-Hospital Service approved November 29, 1897, the following changes in Regulations Governing Uniforms, issued June 20, 1896, are hereby promulgated:

Paragraph 8 changed so as to read:

"8. *Full-dress uniform for officers.*—The full-dress uniform for officers shall be worn at all general inspections made by the Surgeon-General or other inspectors at stations of the first class, at the transfer of hospital and quarantine stations, and on all occasions of special ceremony."

To paragraph 10 add: "and by officers when reporting for duty at stations of the first class."

Paragraph 15 changed so as to read:

"15. *Fatigue uniform for officers* shall be worn by all officers while on ordinary duty at hospitals, and on ordinary quarantine duty, and when inspecting unserviceable property, and at informal inspections by the Surgeon-General, and at the office where out-patients are treated."

To paragraph 19 add: "Shoes of white material may be worn with this uniform."

Wherever the words "stewards of the first class" occur in the Uniform Regulations, they shall be taken as applying to senior stewards; and wherever the words "stewards of the second class" occur they shall be taken as applying to junior stewards; and all uniform regulations for stewards of the third class are hereby revoked.

WALTER WYMAN,

Supervising Surgeon-General M. H. S.

INQUIRY CONCERNING EXPERIENCE WITH SMALLPOX.

[Addressed to each commissioned medical officer.]

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., April 27, 1898.

SIR: You are directed to inform the Bureau whether you have had practical experience in the diagnosis and treatment of smallpox, and whether this experience is of such character as to give you confidence in case your services were demanded as expert.

Respectfully yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

ACCOMMODATIONS FOR OFFICERS REVENUE-CUTTER SERVICE.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington D. C., May 7, 1898.

To Medical Officers and Acting Assistant Surgeons, United States Marine-Hospital Service:

You are informed that the Bureau intends hereafter to provide special accommodations for sick and wounded officers of the Revenue-Cutter Service at relief stations where there is no marine hospital, and you are hereby directed, upon the application of such officers for hospital relief, to make arrangement on the best possible terms for their admission to a private room or ward in the contract or other hospital at your station, reporting your action in each case for approval, giving the rate of charge.

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

PATHOLOGICAL SPECIMENS.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., June 28, 1898.

Medical Officers in Command:

In addition to Bureau circular of June 30, 1896, requiring post-mortem examinations to be made in all cases possible, etc., you are further directed to send to the Hygienic Laboratory, Washington, D. C., specimens from the several organs and pathological processes of each case upon which a post-mortem examination has been made. The specimens should not be larger than 2 to 3 centimeters square, and should be prepared after the following methods:

Two sets of specimens should be prepared, one set to be placed in 50 per cent alcohol for two weeks and then placed over in 95 per cent alcohol for a week or ten days; the other to be placed in Muller's fluid (bichromate of potash, 1 part; sodium sulphate, 2 parts; water, 100 parts) for three days and then changed to fresh fluid and allowed to remain a week. The specimens should then be washed for several hours and then placed in 95 per cent alcohol for a week or more.

The specimens are best labeled by wrapping each in paper, using a lead pencil for labeling.

In preparing the specimens for the laboratory a special mailing case will be sent you.

After the specimens are placed in the glass jar a quantity of absorbent cotton should be placed around the specimens sufficient to maintain them in place, after which a small quantity of 95 per cent alcohol should be poured over the cotton, just sufficient to keep them moist. A label should be affixed to the jar containing the specimens, giving the name of hospital, name of patient, permit number, and date of death.

You will acknowledge receipt of this circular.

WALTER WYMAN,

Supervising Surgeon-General M. H. S.

REPORT OF THE PURVEYING DIVISION.

In the purveying division 631 requisitions for medical and other supplies to meet the needs of marine hospitals and relief stations of the Service have been filled.

Eleven national quarantine stations, five detention camps, and the immigrant hospital at Ellis Island, New York Harbor (under control of the Immigration Service), have also received their supplies in whole or in part through this division.

The amount of labor involved in purveying the material called for in these requisitions was as follows:

Number of packages shipped.....	3,893
Total weight.....pounds..	263,194

The pharmaceutical work of this division performed by the chemist and his assistants shows a total output of 6,323,000 grams of various articles manufactured for issue, of which there were 86 different kinds. These articles are divided as follows:

Elixirs.....	1,050,000
Fluid extracts.....	640,000
Medicated waters.....	75,000
Liniments.....	1,000,000
Spirits.....	146,000
Miscellaneous.....	968,000
Sirups.....	1,409,000
Tinctures.....	970,000
Medicated wines.....	65,000

The following is a summary of the cost of the various supplies purchased for issue during the year:

Medical supplies.....	\$14,583.50
Hospital stores.....	8,391.52
Hospital sundries.....	8,972.98
Surgical instruments and appliances.....	11,301.12
Bedding and clothing.....	12,807.00
Medical books and journals.....	7,113.31

The work of this division during the past fiscal year has been carried on along the lines indicated in my previous annual report—the improvement in equipment of hospitals and supplying them with the most recent medical and surgical paraphernalia. With the exception of one hospital previously noted, all the marine hospitals have now been supplied with modern aseptic operating-room furniture.

Furniture for the wards in the hospitals has also been supplied in increased quantity and improved quality, this statement referring particularly to bedsteads, bedside stands, clothing, etc., for the patients. In respect to this latter item it should be stated that a hospital suit has been adopted for the use of convalescent and other patients. The adoption of this uniform is in line with the efforts made in all hospitals to secure thorough cleanliness both of the building, its contents, and the inmates. Hitherto the patients in our marine hospitals being of the seafaring class, having only their own clothing to wear in the wards, and coming, as they do, from dirty forecastles and unclean decks, it was impossible to secure freedom from danger of infection from this source. The adoption of this hospital suit enables the medical officer in command to strip the patient upon entering the hospital, and after giving him a bath he is clothed throughout with hospital clothing, and the uniform and cleanly appearance of the patients in the wards has justified the small expenditure involved as well as added to their cleanliness and aseptic condition. The suit is made of blue flannel and made on a sailor pattern, with rolling collar, loose blouse, and trousers.

The issue of microscopes and other instruments of accuracy in clinical diagnosis, hæmaglobinometers, and hæmacytometers, has been continued. The old low-power microscopes have been gradually replaced with the most modern high-power instruments, which are now required for expert histological and bacteriological work. Many of these have been issued to officers for their personal custody for the purpose of conducting special bacteriological investigations, and it has been found that this plan insures greater care of instruments as well as a personal interest in their use.

Outfits for working bacteriological laboratories have also been supplied to a number of the stations to increase the facilities of the medical officers in diagnostic accuracy. These outfits consist, in addition to the microscope and blood counting instruments, of centrifuges, thermostats, sterilizing apparatus, staining agents, culture media, and necessary reagents. The development of bacteriological work in the last few years requires that this means of modern medical study should be supplied to officers of the Service in order that they may keep abreast of the times, and the work accomplished by them in the daily hospital routine has justified the issue of these articles.

The use of the "X" ray apparatus having become recognized as a fairly well established aid in diagnosis, arrangements have been made for supplying the hospitals with these machines and already a number have been sent out. Contracts have been made, and during the ensuing year they will be sent to the larger stations.

The funds for the support of this Service heretofore noted as being now sufficient for these expenditures, it was determined to supply the libraries of the stations with recent medical works. For several years past, owing to the limitation of the amount of funds available, but

few books have been furnished; but during the past year this lack has been made up by supplying some of the most recent and approved works in the various departments of medicine and surgery.

The need of adequate room for the use of this division has been mentioned in two of my previous reports, and the subject becomes of more consequence each year. With the increased number of stations, the growing demands of the Service, and the probability of the opening and maintaining of stations in outlying territory which may be acquired as a result of the war, will place upon the department the necessity of providing more space and better facilities for its operation. I respectfully refer to my previous allusions to this subject, and feel that something should be done to meet this necessity. The subject of establishing it in New York City has been considered, following the plan adopted by the Army and Navy. This would probably be the best solution of the problem.

In this connection the following letter was addressed to me by the medical officer in charge of the purveying division:

AUGUST 3, 1898.

SIR: After an experience of over three years in charge of the purveying division, I have the honor to submit the following suggestions in regard to its improvement and development.

The gradual increase of the Service, both in the number of stations and the demands of them upon the Service for medical and surgical supplies and general stores, the increase consisting of an addition of six new marine hospitals within the last ten years and eleven national quarantine stations in the last fifteen years, constitutes an increase of work in the purveying division, which has now come to the practical limit of its capacity in its present quarters. From a business point of view—and this is the commercial division of the Service—the removal of the purveying division and the establishment of it in New York City, the great trade and railroad center of the country, would, in my judgment, be a wise and economical change. A large part of our supplies comes from New York now, and many of them are shipped back over the same lines to stations north and west. Washington is neither an available business, railroad, nor manufacturing center, and proximity of the large and varied market in New York would result to the better interests of the Service in the purchase of equipment and supplies. A suitable building could be rented in the city of New York, selected for its availability for this division, and thus the present problem of requisite and desirable quarters for it would be solved in a very simple way.

The present condition is one of inadequate storage and manufacturing room, and the facilities for the shipping and handling of goods are very cumbersome.

In view of the forthcoming expansion of territory, and with colonial possessions in the West Indies, where in all probability a number of stations will be established in the near future, and with which New York is in direct communication by sea, there exists an additional reason for making the headquarters of the purveying division in New York. This would obviate reshipment at Southern points and add to the rapidity with which supplies can be forwarded to those stations. A large part of the work of the purveying division is performed for the quarantine service, and disinfecting material—sulphur, bichloride, etc.—can not be kept in stock in the present storage rooms, and emergency orders for these articles have to be made direct to the contractors, who, in the past and at present, are located in St. Louis, thus involving considerable delay in delivering material.

The necessity of having sufficiently large stores of hospital and other supplies on which to draw for emergency orders scarcely requires elaboration. It is the basis of successful administration of this division.

With increased capacity, additional classes of hospital supplies could be stored, such as kitchen and hospital utensils and subsistence stores, which are now purchased in small quantities at each station at retail prices. This additional storage capacity would also enable the officer in charge of the purveying division to inspect goods purchased before they are sent out. In the absence of this facility goods are ordered direct from the contractors and manufacturers, and no examination of them can be made prior to issue, and neither the receiving officer nor the medical purveyor can know that the goods delivered are of the required standard. It is only by occasional information, incidentally obtained, that the quality of these goods is known.

This plan of locating the supply department for the Army and Navy has been in operation for many years in New York. I believe that the same reasons which impelled those services to adopt this plan are equally applicable to this Service. The change suggested would be of reciprocal advantage to the internal economy of the headquarters of your office, in that it would add to the available office room a fine apartment on the first floor, which could be utilized as a library and board room and for such literary work as is always in progress, and which can not be satisfactorily done in the confusion of the working parts of the bureau.

The change would involve no difficulties of administration, as the officer detailed as medical purveyor, in charge of the service stores at New York, would simply fill approved requisitions forwarded to him from the bureau, and in all respects be governed by the same regulations as a station of the first class. The present force in service in the purveying division would be ample for duty at the storehouse, with the probable addition of one clerk as stenographer and accountant.

Respectfully, yours,

CHAS. E. BANKS, *Surgeon, M. H. S.*

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

FINANCIAL STATEMENT.

FINANCIAL STATEMENT.

RECEIPTS AND EXPENDITURES, UNITED STATES MARINE-HOSPITAL SERVICE, FOR THE FISCAL YEAR ENDED JUNE 30, 1898.

The balance of the marine-hospital fund available at the commencement of the fiscal year was \$255,714.42 and the receipts from all sources \$859,414.86.

The expenditures were \$600,131.45.

SUMMARY—MARINE-HOSPITAL FUND.

Balance, July 1, 1897	\$255,714.42
Repayment, care foreign seamen, etc.	15,319.01
Receipts, tonnage tax, collected	844,095.85
Total available during the fiscal year	1,115,129.28
Expenditures	600,131.45
Balance, June 30, 1898	514,997.83

Statement of appropriations, quarantine service, 1898.

Appropriation, July 1, 1897	\$137,000.00
Repayment, care foreign seamen, etc.	784.94
Deficiency appropriation	17,500.00
Total available	155,284.94
Expenditures during the fiscal year	155,219.85
Balance, July 1, 1898	65.09

Summary of expenditures, July 1, 1897, to June 30, 1898.

Name of station.	Maintenance of stations, officers' sal- aries, repairs to vessels, etc.	Medical supplies and mis- cellaneous.	Total.
Reedy Island	\$15,267.49	\$972.87	\$16,240.36
Delaware Breakwater	10,243.90	222.86	10,466.76
Cape Charles	12,435.86	553.19	12,989.05
Cape Fear	6,872.38	308.92	7,181.30
South Atlantic	11,606.41	216.18	11,882.59
Brunswick	4,435.14	42.81	4,477.95
Gulf	20,819.41	517.53	21,336.94
Tortugas	23,765.31	832.24	24,597.55
San Diego	4,578.97	16.05	4,595.02
San Francisco	29,793.08	1,516.93	31,310.01
Port Townsend	9,551.72	387.10	9,938.82
Miscellaneous .....	.....	203.50	203.50
Total	149,429.67	5,790.18	155,219.85

Preventing the spread of epidemic diseases.

Summary of expenditures, fiscal year 1898:

Balance, July 1, 1897	\$474,674.86
Repayment, sale of rations	46.00
Total available	474,720.86
Expenditures, July 1, 1897, to June 30, 1898	217,529.93
Balance	257,200.93
Deficiency appropriation (act July 7, 1898)	200,000.00
Balance as of July 1, 1898	457,200.93

Expenditures in detail, July 1, 1897, to July 1, 1898:

Foreign medical service, salaries, and miscellaneous, viz:

Havana, Cuba: Sanitary inspectors, etc	\$8,867.69
Sanitary inspectors, Rio de Janeiro, Kanagawa, etc	6,325.90
	15,193.59

Sanitary inspectors in United States: Salaries, traveling expenses, and miscellaneous	12,772.51
San Francisco, Cal.: Guards, yellow fever, fluid vaccine, etc	302.00
Waynesville, Ga.: Hospital tents. Buzzacott ovens, custodian, etc ..	4,011.00
Savannah, Ga.: Storage on disinfecting apparatus, etc	80.18
Birmingham, Ala.—Smallpox epidemic: Sanitary inspectors, guards, traveling expenses, etc	16,995.94
Middlesboro, Ky.: Smallpox epidemic—Sanitary inspectors, guards, traveling expenses, etc	3,411.03
Cape Charles: Nurses, smallpox cases	24.00
Scientific investigation yellow fever: Salaries, traveling, rents, etc	4,255.54
Yellow-fever epidemic: Physicians, guards, nurses, disinfectants, freight charges, etc	160,484.14
Total	217,529.93

Appropriations for marine hospitals, act March 3, 1891.

Mobile, Ala., amount of appropriation	\$1,500.00
Balance July 1, 1898	1,500.00

Appropriations for marine hospitals, acts June 4, 1897, and July 19, 1897, transferred to Supervising Architect.

Cleveland, Ohio	\$2,725.00
Cincinnati, Ohio	2,000.00
Evansville, Ind	6,000.00
Key West, Fla	1,700.00
New Orleans, La	2,150.00
Wilmington, N. C	200.00

Appropriations for quarantine stations, act August 1, 1888.

Stations.	Balance July 1, 1897.	Expendi- tures fiscal year.	Balance June 30, 1898.
Cape Charles	\$2,719.18	0	\$2,719.18
Tortugas	10,056.22	0	10,056.22

San Francisco Quarantine, act August 5, 1892.

Balance July 1, 1897.....	\$0.10
Amount deposited to credit Treasurer United States .....	.10

San Francisco Quarantine Station, act March 2, 1895.

Balance July 1, 1897.....	\$0.13
Amount deposited to credit Treasurer United States .....	.13

South Atlantic Quarantine, act August 5, 1892.

Balance July 1, 1897.....	\$3.16
Amount deposited to credit Treasurer United States	3.16

Chesapeake Bay Quarantine Station, act March 3, 1893.

Balance July 1, 1897.....	\$6,935.00
Balance July 1, 1898.....	6,935.00

Brunswick, Ga., act June 4, 1897.

Amount of appropriation.....	\$1,250.00
Expended to June 30, 1898	1,245.25
Balance July 1, 1898.....	4.75

South Atlantic Quarantine, act June 11, 1896.

Balance July 1, 1897.....	\$750.00
Expended to June 30, 1898	750.00

Southport Quarantine Station, act August 18, 1894.

Balance July 1, 1897.....	\$0.20
Balance July 1, 1898.....	.20

Delaware Breakwater Quarantine, act March 2, 1895.

Balance July 1, 1897.....	\$80.25
Amount deposited to credit Treasurer United States	80.25

Brunswick, Ga., Quarantine Station, act June 11, 1896.

Balance July 1, 1897.....	\$340.12
Balance July 1, 1898.....	340.12

Gulf Quarantine, acts March 3, 1891, August 5, 1892, and August 18, 1894.

Balance July 1, 1897.....	\$1,347.57
Expended to June 30, 1898.....	1,347.57

Gulf Quarantine Station, act June 11, 1896.

Balance July 1, 1897.....	\$127.46
Balance July 1, 1898.....	127.46

Port Townsend Quarantine Station, act June 11, 1896.

Balance July 1, 1897.....	\$881.10
Expended to June 30, 1898.....	508.40

Balance July 1, 1898.....	372.70
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San Francisco Quarantine, act June 11, 1896.

Balance July 1, 1897.....	\$694.40
Expended to June 30, 1898.....	694.40

San Diego Quarantine, act June 11, 1896.

Balance July 1, 1897.....	\$2.50
Amount deposited to credit Treasurer United States.....	2.50

Appropriations for quarantine stations, act June 4, 1897.

Delaware Breakwater.....	\$1,500.00
Expended to June 30, 1898.....	1,498.00

Balance July 1, 1898.....	2.00
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South Atlantic appropriation.....	9,425.00
Expended to June 30, 1898.....	1.50

Balance July 1, 1898 <i>a</i>	9,423.50
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Tortugas Quarantine Station appropriation.....	13,500.00
Expended to June 30, 1898.....	4,000.00

Balance July 1, 1898 <i>b</i>	9,500.00
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a Expenditures authorized, \$8,970.48.

b Reappropriated for fiscal year 1899, act July 1, 1898.

REPORTS OF FATAL CASES, WITH NECROPSIES.

REPORTS OF FATAL CASES, WITH NECROPSIES.

ENTERIC FEVER.

CASE 1.

Cerebro spinal meningitis.

F. G.; aged 29 years; born in Austria; admitted to marine ward, German Hospital, Philadelphia, Pa., March 8, 1898; died March 13, 1898.

Family history.—Negative. For past-week has had feeling of general malaise, intense headache from beginning of attack. Bowels have not moved for past four days. Has had chills at irregular intervals since beginning of attack; were not followed by distinct fever or sweats. Headache is general in character but more severe in occipital region. Has had no epistaxis, cough, or expectoration. He felt sick enough from beginning of attack to be in bed. On admission temperature 38.2° C., pulse 98, good volume and compressible. Pupils about normal in size. Tongue heavily coated. Abdomen was scaphoid; no tenderness or gurgling in right iliac fossa. Area of splenic dullness enlarged. No eruption was noticed on any portion of body. Examination of heart was negative. Lungs normal except at left apex, at which point there was dullness on percussion and complete absence of breath sounds. Examination for malarial organisms was negative. Widal's reaction was positive both by city board of health and German Hospital laboratory. Three days after admission there was conjugate deviation. Urine showed trace of albumen, many leucocytes, hyaline, epithelial, and pale granular casts. Face cyanosed. On day of death, about twelve hours before his demise, there were physical signs of consolidation of greater portion of lower left lung. Opisthotonos present.

Autopsy.—Height about 1.73 meters. Post-mortem lividity very marked. Rigor mortis also very marked, and could only be broken up in arms, for instance by applying a great amount of force. General nourishment very good. Pupils equal and moderately dilated. The heart weighed, after opening, 430 grams. The mitral, aortic, tricuspid, and pulmonary valves were all found in good condition. The aortic and pulmonary were found competent by the hydrostatic test. The walls of the ventricles were normal macroscopically, and the usual proportion of 4 to 1 was maintained. The thoracic aorta was found clear and smooth throughout. The abdominal aorta also found clear and smooth, except where the bifurcation into the iliacs takes place there were a few specks of atheromatous change. The femoral and other arteries and veins, so far as observed, were found normal. The nares, larynx, and trachea presented no marked pathological changes. The left lung weighed 1030 grams. The pleural cavity was moistened by a serum-like fluid. Near the apex the cavity was nearly obliterated by many dense adhesions which were broken up with some difficulty. The entire lower lobe of the lung appeared to be consolidated, red in color, friable, and portions when placed in water sank at once, also did not crepitate when squeezed between the fingers, and gave sense of resistance when pressed upon, like a

piece of liver for instance. The right lung weighed 820 grams. Nothing abnormal was noticed about pleural cavity, except at apex, where it was obliterated. The pleura was bound down in many places by adhesions to the pleural wall, which apparently were recent in character and readily broken up. The middle and lower lobes presented a normal appearance. In the greater portion of the upper lobe, but especially toward the apex, the lung showed evidences of consolidation. Near extreme apex and posteriorly there was a cavity about 5 cm. in diameter, in which there was a caseous material; many bronchi were bunched together, the lung structure apparently having been destroyed between them; the cavity was near the surface. Lower down there were several masses of fibrous tissue, encapsulated in the lung structure, very resistant on section, firm, and inelastic. The lung structure on section presented many tubercles about the size of a millet seed. The peribronchial glands were much enlarged and softened. On section they presented a caseous material, also some tubercles. The organs all bore the normal relationship to each other. The omentum was somewhat shortened. The peritoneum showed no pathological changes. Tongue was heavily coated with brownish-white fur. The pharynx was congested. The œsophagus showed no pathological change. The stomach contained a small amount of fluid which resembled curdled milk. Walls were coated with a tenacious slimy material. The diameter of the pylorus was 1.5 cm.; the diameter of the cardiac orifice 2.5 cm. The small intestine was congested. The ileum presented six oval ulcers in its lowest portion, opposite to the mesenteric attachment, their long axis in the long axis of the gut, their floor smooth and slimy, edges thickened and undermined. Mesenteric glands were enlarged, especially those in direct connection with that portion of the intestine in which the ulcers were found. Small areas of the large intestine were congested at points. The hepatic flexure and transverse colon were filled with hard fecal masses, which when mixed with water made a pea-soup material in appearance. Rectum was found, patulous and not altered from normal. The capsule of the liver was adherent, especially the diaphragmatic side; on attempting to strip it much difficulty was experienced, small bits of liver tissue being torn away. Macroscopically the condition presented a perihepatitis. The liver was chocolate red in color, weighing 1,600 grams, resistant to the touch and cut harder than normal, and on section presented the macroscopical appearance of an oncoming cirrhosis. The microscopical examination will be appended. The gall bladder was about half filled with bile. The ducts all found patulous, the walls somewhat thickened. Pancreas: Normal in appearance; weight, 115 grams. Left kidney weighed 150 grams. Appeared larger than normal; was congested. On section the cortical portion was found thickened; small areas of hemorrhagic change were found in medullary portion. Capsule stripped readily. Right kidney weighed 190 grams and presented the same general characteristics as the left. The pelvis contained a small amount of fluid which resembled cloudy serum. Pelvis and ureters: These parts appeared normal. The urethra had about the normal caliber throughout; on the introduction of the sound no strictures were observed. On longitudinal section the penile portion was somewhat congested; otherwise was normal. The prostate was palpated through the rectum and not found enlarged. On section no changes had taken place. The right and left suprarenal bodies showed no macroscopical changes, each weighing 10 grams. The general shape of the head had a tendency to squareness or box shape. The skull proper was of average thickness. The membranes of the brain were deeply congested. The veins and arteries were engorged. A large vein running in the membrane that covered the upper portion of the right occipital lobe had in its course an air or gaseous embolus, upon either side of which there was blood; no puncture in the vein could be observed. On the cortex there was much lymph, especially on either side of the longitudinal sinus. This lymph was immediately under the arachnoid and was of a yellowish-

white color and of a caseous consistency. The brain to either side of the longitudinal fissure was covered with a sero-purulent material which filled the various fissures and sulci to about the general brain level. The medulla was well covered with a purulent exudate. The brain weighed 1,320 grams. Spinal canal: The canal was opened throughout the entire extent; the membranes were deeply congested; veins much engorged; at the greater and lesser curvature of the spine there was a bulging of the coverings of the cord; on palpation a sense of fluctuation was imparted to the fingers. On incision a purulent exudate was found at these points, just below the arachnoid; the cord was covered throughout with a lympho-caseous material, but at point mentioned above it existed in much larger quantities. Cultures taken from the surface of the brain and at several points along the cord revealed a growth of staphylococcus aureus and albus. A culture taken from the spleen immediately after opening the body revealed a growth of pure typhoid bacilli. Death was due to cerebro-spinal meningitis, complicating enteric fever.

Addendum: Liver—Microscopical examination of the organ revealed marked increase in interstitial tissue around the blood vessels, the vessels themselves being thickened. The liver cells contained a pigment, part of which was a hæmogeneous material, reacting to the appropriate chemical test.

F. I.

CASE 2.

Perforation—Peritonitis—Aneurism superior vena cava.

R. L. (colored); aged 33; nativity, Maryland; was admitted to the United States Marine Hospital, Baltimore, Md., April 9, 1898, and died April 28, 1898.

History.—Four days previous to admission to hospital he received a severe blow in the left hypochondriac region. The next day there was great soreness over the abdomen. Had one stool from the time of the receipt of injury until admission to hospital, and some blood, he says, was passed at that time. On admission temperature was 40.2° C. Patient complains of tenderness in abdomen; bowels are constipated, and slight tympanitis is noticed. Tongue is heavily coated, pulse rather rapid. Constipation persisted for several days and cathartics were given several times before a stool was passed. When the tendency to constipation was overcome a diarrhea set in and stools of a very dark color and of foul odor were voided. Later on the stools changed in character, being ochre yellow in color and of typhoid character. Urine examined showed no albumen nor sugar, and examination of the blood for malarial organisms was also negative. On April 19 the blood gave Widal reaction and diagnosis of typhoid was made. Meanwhile some pain in the abdomen continued and an abscess pointed in the ischio-rectal region, and on being evacuated was found to contain a dark foul-smelling fluid of the same general character as the diarrheal fluid already mentioned, although at the autopsy there was found to be no connection with the pelvic cavity. Patient had a severe chill, followed by a temperature of 40° C., on the 10th, and several at irregular intervals later. Cold baths were given at short intervals and strychnia sulph. administered every three hours, and salol and bismuth subnit. every four hours. A quiet delirium set in a few days before death and the patient was unable to control the evacuation of the rectum or the bladder. He gradually sank and died about 5 p. m. April 28, 1898.

Necropsy (eighteen hours after death).—Body much emaciated; rigor mortis marked. Heart appeared normal; a small sacular aneurism, of about 50 c. c. capacity, of the superior vena cava was found near its entrance into the auricle. No other abnormality of the mediastinal spaces was found. The lungs showed a slight degree of hypostatic congestion posteriorly, but in other respects appeared normal. Upon opening the abdominal cavity the intestines were found matted together by exudate, and a considerable quantity of sanguineous purulent fluid

was present in the peritoneal cavity. The serous coat of the bowels was much inflamed, and for a distance of from 20 cm. to 40 cm. from the ileocaecal valve the tissue of the small intestine was breaking down and several perforations were to be seen. The stomach contained a small amount of undigested milk and was slightly distended with gas. The liver and kidneys appeared normal and the gall bladder contained a small amount of bile. The urinary bladder was empty and contracted. The spleen was considerably enlarged. Other organs appeared normal.

C. H. G.

G. P.

CASE 3.

F. E. C.; aged 31 years; nativity, Massachusetts; admitted to marine ward, German Hospital, Philadelphia, Pa., November 12, 1897; died November 24, 1897. 8.10 a. m.

History.—Patient had a chill about one week ago, which was followed by a fever and a sweat; he also had a severe headache, pain in the back and legs, anorexia, constipation, general malaise. The above paroxysm was repeated every day for one week. He took a large dose of quinine before coming to the hospital. On admission the tongue was heavily coated, broad and flabby. Spleen was enlarged. Heart was irregular in action, with a double beat with every cardiac cycle. Lungs were negative. Three days later remissions ceased to occur in the temperature, which became continuous in type; pupils were dilated; pulse became dicrotic; headache was continuous; spleen became more enlarged. Widal's reaction for enteric fever was positive. On the evening of November 20 he was seized with a sudden sharp acute pain in the right iliac fossa, which was tender on pressure. Two hours later there was rigidity of the right rectus; abdomen became somewhat distended. Several hours later there was a boardlike hardness all over the abdomen, tympanitis was much increased, hepatic dullness was almost obscured, and the abdomen became exceedingly tender to touch. For next few days temperature gradually fell, spleen became diminished in size. Patient gradually grew weaker until death took place.

Necropsy (three hours after death).—Rigor mortis was not apparent; post-mortem lividity was well marked, especially around the neck. General nourishment was very good. Left pupil was much larger than right. The heart stopped beating in diastole. The heart weighed 400 grams, was deeply congested, the coronary veins being much distended and tortuous. The pericardial sac was apparently normal, the serum being of a pale straw color and about 15 c. c. in amount. The aortic, mitral, and pulmonary valves were examined in turn, and not the slightest imperfection could be detected. The left ventricle bore the normal relation in thickness of wall to the right 4 to 1. The muscular structure of the heart did not seem to be quite as firm as the normal. The right ventricle was partially filled with a post-mortem clot; papillary muscles were found intact. The thoracic aorta showed a few very minute specks of atheroma. The abdominal aorta was smooth throughout its entire course. Other arteries and veins were normal so far as observed. The nares were slightly congested. Larynx and trachea were clear and patent throughout. The left lung weighed 350 grams, was bound down by many adhesions, and there was a slight hypostatic congestion at the base: the lung when placed in water floated very readily. The right lung weighed 550 grams, was slightly congested, floated readily in water, and was so strongly bound down by adhesions anteriorly and at the sides that it was removed only with the greatest difficulty. The condition of the pleural cavity could not be accurately observed, owing to dense adhesions. The abdomen was much distended, and on careful opening, in order that the intestines might not be disturbed, it was found that a large amount of gas was emitted from the cavity and collapse of the walls immediately occurred; the intestines were not greatly distended. The cav-

ity was also filled with a sero-purulent fluid, which was of a yellowish green color; the intestines and all the organs within the peritoneal cavity were coated over with a flocculent lymph. The peritoneum showed the signs of inflammation as well as the mesentery. The tongue was coated with a brownish-white fur and was red at the tip; no sordes was observed. The pharynx and œsophagus were normal.

The stomach was partially filled with a turbid fluid and small masses which resembled casein. The diameter of the pyloric orifice of the stomach was 1.25 cm.; that of the cardiac orifice 2 cm. The small intestine was somewhat inflamed and contained a small amount of feces. The appendix was firmly bound down by adhesions; it was about 9 cm. in length, about 1 cm. in diameter, and just a short distance (1 cm.) from the distal end there was a constriction in its lumen, and on opening it lengthwise a drop of pus was found in the blind end which had been cut off by the constriction. At the point where the ileum joins the large intestine, opposite to the mesenteric attachment, an oval ulcer was found placed longitudinally. The ulcer had overhanging edges and a smooth base which apparently extended down to the muscular coat; it was grayish in appearance. The large intestine was partially filled with feces, the head of the cæcum was firmly bound down by adhesions to the side of the belly wall, and in its interior were found two oval ulcers nearly opposite the mesenteric attachment, about 2.5 cm. in their greatest diameter. One of the ulcers seemed to be very deep and apparently only had the peritoneal coat for its base. The edges were soft and overhanging. Its greatest diameter was in a longitudinal direction. The capsule of the liver was partially covered with flocculent lymph; it was slightly congested, deep dark red in color—no discoloration—and weighed 1,945 grams. The gall bladder was found with a small amount of bile; no gall stones. The ducts were found patent. The pancreas was very friable; weighed 150 grams. The left kidney was found slightly congested; weighed 210 grams. The right kidney also slightly congested; weighed 200 grams. The pelvis on right side was somewhat thickened; the ureter was constricted and dilated at several points along its course. The left ureter was of proper diameter throughout. The bladder was much below the normal in size, but did not show any signs of acute or chronic inflammation. The urethra was found to contain a stricture of large caliber in the prostatic portion. The prostate gland was not enlarged. The spleen was only very slightly enlarged, friable, and weighed 140 grams. Close to but not attached to the spleen a small, round body about 2 cm. in diameter was found which macroscopically resembled splenic structure. The head was of an average size; the scalp was covered with a growth of stiff hair. The skull was 0.75 inch in thickness at the crown. The membranes of the brain were congested, especially the pia mater. The brain weighed 1,350 grams.

The cause of death was undoubtedly peritonitis, which was due to a minute perforation or the direct migration of pathogenic organisms through the thin wall which remained as the bottom of the deep ulcer which was found in the cæcum. The adhesion of the cæcum to the belly wall can, perhaps, be accounted for by the inflammatory process connecting the peritoneal coat of the cæcum with that of the parietal coat, and thus also, perhaps, spontaneously closing the perforation.

F. I.

CASE 4.

A. B., aged 34 years; nativity, Sweden; admitted to the marine ward of St. Vincent Hospital, Portland, Oreg., May 16, 1898; died May 21, 1898.

History.—The patient complained of languor, muscular weakness, and loss of appetite for fourteen days; also of fever, sweating, and headache in the evenings. Several bloody evacuations, unaccompanied by pain or straining, occurred about thirty-six hours before applying for hospital relief. These tarry stools were the

first alarming indication that the patient had that a serious illness might supervene. Physical examination did not greatly aid the diagnosis, for at the time of admission very few of the signs of enteric fever could be found. A few rose spots existed in the upper zone of the abdomen, but a profuse eruption of acne was present. There was no pain or tenderness on pressure in the abdominal cavity. The evening temperature reached 40° C., and gradually declined until the normal point was reached on the morning of the 19th. Symptoms of an acute general inflammatory invasion of the peritoneal cavity supervened on the 18th; such as pain on pressure and at times in paroxysms; vomiting, spontaneous and following the ingestion of food and medicines; distension of the abdomen. The gaseous distension was most prominent the next day, hepatic dullness being almost entirely replaced by a tympanitic note. For two days these symptoms continued, together with a soft and rapid pulse (120), dry, parched, brown tongue, and a temperature of 39° C. A pleuritic friction murmur developed on the right side, but there was no effusion into the cavity. Nearly all pain and discomfort ceased about twenty-four hours before death; consciousness was retained to the last.

Necropsy (sixteen hours after death).—Body emaciated and abdomen greatly distended. The bones of the skull were thin, and the cap was removed without difficulty. The longitudinal sinus contains what seems an unusual amount of blood, and many of the meningeal veins are congested. No macroscopic abnormalities could be detected throughout the cerebral substance. The brain weighs about 1,320 grams. Thoracic cavity: The right pleural sac contains about 30 c. c. of a reddish fluid; the lung is adherent by new formations to the diaphragm, and its posterior surface is congested, as is also the parietal pleura. The left sac contains a similar amount of fluid; the base of the left lung is congested, and a small, calcareous tubercle is seen on the inner face of the inferior lobe. There are no adhesions. The pericardial sac contains a reddish fluid, a little more than is usually found. The heart is pale in color and normal in size and situation. On the left side the walls are of the usual thickness and the left ventricle is empty, with the exception of a small clot. The right side contains in both cavities ante-mortem clots; that in the auricle is especially large. The valves are competent.

Abdominal cavity: The position of one or two of the parts is abnormal; the liver is pushed backward by distended coils of the intestines, and on every side are signs of a general peritonitis. All the intestines are inflated, some agglutinated, and there is a faecal odor emanating from the fluid that wells up from the depths. The fluid consists largely of a fibrino-purulent exudate and liquid faecal matter. The great omentum presents a few distended veins and is congested and gummy; the peritoneum is similarly affected and in the right iliac fossa is adherent to intestine. A search reveals a perforated ulcer in the lower ileum about 3 feet from the ilio-caecal valve. The aperture in the lumen of the bowel is very small, its dimensions would hardly admit the body of a pea. Within 2 to 5 inches of the ilio-caecal junction, there are a number of ulcers, about a dozen in all. Denudation of the mucous membrane is complete in spots and has assumed many shapes—some circular or stellate, others oblong, and a few coalescing. Several are the size of a dime, the mucous membrane between them being corrugated, congested, and forming undetached sloughs. The ulcers are, for the most part, situated in the wall opposite to the attachment of the mesentery, and doubtless originated in the Peyerian glands. Solitary and the agminated follicles are swollen in the lower ileum, and can be distinctly seen by the unaided eye. Many of the mesenteric glands, especially in the ileo-caecal chain, are enlarged and present the so-called medullary appearance. The intestinal contents are not copious, and they differ in different portions of the canal. Soft adherent material, possessing little odor, of a dark green or brown hue, is found in the ileum; near the

ulcers there is some discoloration of the bowel walls, due to the blood pigment. Scybalous masses are found in the rectum and sigmoid flexure. The stomach is distended with gas and contains 100 c. c. of green fluid; the pyloric orifice is normal. The liver is normal in size and color, but is pushed backward and upward by the distended intestines. It has a tough coating of fibrino-purulent exudate. Gall bladder half filled with fluid bile of normal color. The spleen is enlarged; its pulp is friable and abundant, and its color externally is obscured by a covering of plastic material. The other abdominal viscera are normal in consistence, size, and color. The spleen weighed 275 grams, and the liver about 1,895 grams.

R. B.

CASE 5.

G. S. W.; aged 28; nativity, Michigan; admitted to marine ward of St. Francis Xavier Infirmary, Charleston, S. C., March 4, 1898; died March 11, 1898.

History.—Patient stated that he had cough, fever, and chilliness, with nausea, for several days previous to admission; he also had slight diarrhea and headache, vomiting and anorexia; some abdominal pain; also expectoration, resembling that of bronchitis; sometimes this was sparsely streaked with blood that apparently came from the posterior nares. On day of admission had severe chill, and temperature rose to 40° C., followed by moderate sweating. On the following day temperature reached 40.5° C. and delirium came on, which became at times violent, and eventually patient became comatose, and died in that condition on the morning of the 11th. There had been no tympanitis, gurgling in right iliac fossa, sudamina, rose spots on abdomen, nor dry and heavily coated tongue, and the diagnosis was uncertain, wavering between malarial disease, influenza with meningitis, and typhoid fever, until the post-mortem revealed the true condition.

Necropsy (fifteen hours after death).—Rigor mortis present; body very slightly emaciated; muscles well developed; skullcap, brain, and membranes normal in appearance; heart and pericardium normal; lungs apparently normal, with some post-mortem congestion posteriorly; pleura normal; omentum somewhat injected; mesenteric glands greatly enlarged and mesentery thickened; spleen enlarged and friable; kidneys apparently normal, with capsules slightly adherent; pancreas normal; bladder normal and full of urine; prostate, penis, testes, rectum, and stomach normal; stomach empty; small intestines contained thin feces, yellowish gray in color; intestinal walls were thickened and injected in the lower part of the ileum, and in the neighborhood of the ileo-cæcal valve were found numerous ulcers, typically typhoidal. There were no perforations. The solitary glands in the cæcum were greatly enlarged, and the cæcum itself thickened and injected. Weight of organs: Heart, 330 grams; right lung, 690 grams; left lung, 580 grams; spleen, 420 grams; pancreas, 50 grams; kidneys, 180 grams each; liver, 1,500 grams.

F. F. S.

J. V.

CASE 6.

Supernumerary spleen.

W. S.; aged 19 years; nativity, New York; admitted to United States Marine Hospital, Cleveland, Ohio, November 4; died November 11, 1897.

History.—Mother died from tubercle of the lungs. Family history otherwise presents nothing of special interest. Patient was ill for ten days before he applied for relief with malaise, pain in the back and limbs, fever, and diarrhea. When admitted he had gurgling in right iliac region, no decided tenderness on pressure, rose spots on abdomen, tongue coated and red at tip and edges, diarrhea, and a temperature on admission of 40.8° C. The urine contained albumen and gave Erlich's diazo reaction. No plasmodium was found in the blood. By the use of

frequent baths and intestinal antiseptics the temperature was diminished, but the patient's general condition did not improve; the diarrhea became troublesome, the tongue dry and brown, with sordes on the teeth, the tympanites excessive and distressing; delirium set in, and he died on November 11, seven days after admission.

Necropsy (twenty hours after death).—Cadaveric rigidity present. Post-mortem staining on dependent portions of body. Abdomen greatly distended. Brain not examined. Chest: Heart in systole; moderate in size; left ventricular wall 1.50 cm. thick, right 0.310 cm. Valves normal. No pleuritic adhesions. Lungs show hypostatic congestion. A small leucomatous patch the size of a dime was found in the apex of the left lung; otherwise both lungs normal and crepitant throughout. Abdomen: Liver normal. Stomach and intestines, large and small, greatly distended by gas. External surface of ileum shows points of congestion opposite Peyer's patches. Peyer's patches ulcerated and softened, ulcers numerous, and two, the size of a navy bean, have extended down to the peritoneal coat. Mesenteric glands much enlarged. Small intestine contains semifluid ochre-colored feces. Descending colon congested in patches above the sigmoid flexure. Spleen enlarged, softened, and a supernumerary spleen 5 cm. by 7.5 cm. and 0.625 cm. thick was found, attached by a fibrous band, bearing blood vessels, to the spleen proper. Kidneys large, congested, and cortical portion increased in amount. Ureters, bladder, and urethra normal.

D. A. C.

CASE 7.

Typho-malarial fever.

H. F. H.; aged 35 years; nativity, Wisconsin; admitted to the United States Marine Hospital, Cairo, Ill., November 10, 1897; died November 14.

Clinical history.—Employed on the dredge *Beta* two months at St. Louis, Mo., coming to East Cairo, Ky., August 19, 1897, and to Point Pleasant September 1, where he worked on the same dredge until taken ill, on October 29, 1897. On September 1, before going to Point Pleasant, he applied for treatment at the hospital in Cairo. Diagnosis, ulcer of cornea and intermittent malarial fever. The last illness began October 29 with a dumb chill. He kept about the vessel, not being confined to bed until November 8. He had been able to eat something, but had little appetite. When admitted his bowels were constipated, and he was mildly delirious. His skin was clay colored, indicating malaria: 12th, still delirious; continued quinine through the day; 13th, congestive chill; delirious all through the night; tried to get out of the window. At 6 a. m. patient's pulse very weak; unconscious, and he is apparently dying; hypodermic of nitroglycerine given, and patient's condition improved. At 10 a. m. patient was given 3 grams of quinine by rectal injection, partly or wholly voided an hour later; 1.30 grams by stomach at 1 p. m., repeated at 6 p. m. Patient swallowed and retained a little milk before noon, and took some later in the day; looked much better at 7 p. m., and was quiet and rational; 14th, looks much brighter; is perfectly quiet; no fever; 1.30 grams quinine three times a day. Died suddenly at 10.45 a. m.

Necropsy.—External examination: General nutrition fair. Skin muddy or clay colored. Rigor mortis beginning. No other external evidence of disease. Brain removed; dura mater thickened and opaque along longitudinal sinuses and adherent to skull in this locality. The vessels of the pia mater were injected over the entire brain, there being several bright red spots on the convexity, showing slight hemorrhages under the pia. The brain substance was firm throughout on section. Thorax: A slight amount of fluid in pericardial sac. Right auricle, and large veins emptying into it, were much distended with fluid blood. Right ventricle

nearly empty; left ventricle contracted. Weight of heart, 240 grams. Walls of heart rather thin, but of normal color and consistence. Valves normal. Lungs: Right, everywhere adherent to costal pleura and to diaphragm; left slightly adherent at a central point anteriorly. Lungs contained considerable pigment. There were no spots of consolidation or congestion. The great vessels and nerve trunks were of normal appearance. Abdomen: External appearance of organs.—The intestines were distended with gas and showed several dark-colored areas, chiefly in the ileum. The liver appeared large and dark colored. The omentum was of darker yellow color than usual, and contained only a small amount of fat. Spleen, 15 cm. by 10 cm. in diameter, of dark-brown color and firm consistence. The kidneys were swelled, the edges of the capsules being retracted on incision. The cut surface of dark-red color, exuding blood on slight pressure. The adrenals were normal. The bladder was contracted, with thickened walls and containing very little urine, rather cloudy in appearance. The mucous lining of the bladder was dark pink in color, apparently much thickened and congested. Organs of generation normal. The liver was large; of dark chocolate color; of firm consistence and friable. Weight, 2,750 grams. The gall bladder was partly filled with thin bile of light-green color. The pancreas was of normal appearance. The intestines were removed, leaving a large number of enlarged lymphatic glands. The cæcum, near the valve, presented two or three ulcers of about 1 cm. in diameter. The ileo-cæcal valve on the side of the ileum was lined with small ulcers and the small intestines for a distance of 15 cm. presented many more of the same character. The dark spots noted above as being seen externally marked the location of the ulcers; none of them were large and none occupied Peyer's patches by preference. There were portions of the intestine in this locality showing deep injection of vessels running transversely in the mucous membrane. The vermiform appendix was 13 cm. in length, and contained two grape seeds and several small faecal concretions. The mucous membrane at this point was thickened and congested. Other parts of the intestine and organs were examined and found normal.

Remarks: The history of this case, the general appearance, including the color of the skin, indicated that the patient was suffering from malarial poisoning, while the presence of the ulcers, though not quite characteristic of typhoid, render it probable that the patient had suffered from typhoid infection also.

P. E. K.

PERNICIOUS MALARIAL FEVER (EXHAUSTION).

J. P. (colored), aged 24 years; nativity, Mississippi; admitted to the United States Marine Hospital, New Orleans, La., June 5, 1898; died June 17, 1898.

History.—On admission, complained of ulcers in groin and on penis; also of having chills regularly for the past few months. Examination: Patient weak and emaciated. Eyes yellow and sunken, cheeks hollow, mucous membranes pale and anemic. Examination of inguinal region show large ulcerating surface involving skin and superficial fascia. Penis is swollen and oedematous. The prepuce is adherent to the glans; there is complete phimosis with a pin-hole opening through which patient passes urine. A chancroidal ulcer extends along the whole undersurface of penis. The ulcers on penis were cauterized and an incision made through the swollen prepuce to the glans penis. Glans penis was freed from adhesions, so that patient could now urinate freely.

June 6.—Patient had two chills, one at 3 a. m., the second at 9.30 a. m. Temperature 40.2° C.; vomiting set in, bilious in character, intense prostration, pulse feeble and small, 122 per minute, sclerotics of eyes were yellow, tongue dry, broad, and heavily coated. Examination of blood showed the small intracorpuseular malarial organism in large numbers. The patient was given quinine.

bi-sulph. 0.30 grams by hypodermic, stimulants of strychnine and whisky by hypodermic. The chills and vomiting and bilious appearance continued for several days until the 11th, when patient showed slight change for the better. Patient began to take fluid nourishment by mouth. The temperature range was chiefly intermittent in character, ranging between 37° C. to 40.2° C., pulse followed variations of temperature, ranging between 92 and 120 per minute. Although the vomiting ceased and patient began taking some fluid nourishment, he remained in partial stupor and was occasionally delirious. Quinine was given in large doses, followed by dilute nitric acid; stimulants were freely administered, yet the depression continued. Malarial organisms were found in the blood on the 6th to 10th, inclusive; none on the 11th and days following.

Necropsy.—Autopsy held one-half hour after death. Very slight rigor in lower jaw. Marked general emaciation. Eyes sunken; sclera yellow. Cheek bones prominent; cheek sunken. Superficial appearance of chest shows marked emaciation. Clavicle, ribs and scapulae prominent. Abdomen is sunken and hollow in appearance. Two large ulcers in both inguinal regions; the one on right side is 22 cm. long by 10 cm. wide; left side 10 cm. long by 5 cm. wide. Ulcer of penis involves the whole of foreskin and whole length of under surface of penis. On section, the serous membranes have an icteric appearance. The costal cartilage is of a pale yellow hue. The pericardium is apparently normal; contains about normal amount of serous fluid. Heart weighs 250 grams; flabby, small, while its muscular structure is pale and anemic. Valves and cavities apparently normal. Respiratory organs: Right lung collapsed on opening of its pleura. Weight, 465 grams. Surface is darkly pigmented and smooth; crepitates normally. On section some frothy fluid exudes from cut surface. Left lung collapsed on opening of left pleura, except a portion of the upper lobe, which was fastened anteriorly and posteriorly by bands of old adhesions. Weight of left lung, 362 grams. Surface smooth, bluish-gray in color, with numerous small spots of dark pigment; crepitates normally. On section, a very few small, scattered tubercles noticed on cut surface of upper lobe. Section of lower lobe apparently normal. Bronchial lymphatic glands not enlarged. On section, the abdominal walls are very thin, the muscles are anemic, the peritoneum smooth and free from any adhesions. There is a faint yellow hue to the whole intestine. The small intestines appear collapsed, as also the large bowel, on superficial view. The stomach is empty and collapsed; the duodenum seems normal. On making pressure on gall bladder with organs in situ the ducts are patulous and the flow of bile into duodenum is free. Mucous membrane of small intestine for a distance of 50 cm. next to caecum is normal, not a sign of ulceration. The colon is empty, except the sigmoid and upper third of rectum, which contains faeces. The liver weighs 2,250 grams. Its surface is smooth. On section, is light brown; contains blood and few minute tubercles over cut surface. Gall bladder full; no calculi. Spleen weighs 320 grams; is moderately enlarged; surface is smooth. On section, is dark red in appearance; full of blood. Right kidney weighs 195 grams. On section, has a brownish-yellow appearance. Left kidney weighs 215 grams. On section, is yellowish-brown. Genito-urinary system normal. Other organs normal. Primary cause of death, pernicious malarial fever, algid form. Secondary cause, exhaustion.

R. H. von E.

TUBERCLE OF LUNGS.

CASE 1.

C. R., aged 60; nativity, Virginia; was admitted to the United States Marine Hospital, Baltimore, Md., November 19, 1895, and died April 13, 1898.

Previous history.—Was admitted to hospital at Norfolk about a month previously, where a diagnosis of tubercle of the lungs was made. At first he had a remittent fever with a temperature of from 39° to 40° C., but this disappeared under the use

of quin. sulph. Cough was very troublesome, appetite was poor, patient was losing weight fast, and tubercle bacilli were found in the sputum. Physical examination showed less movement in respiration on the left side than on the right; the clavicle was quite prominent. Dullness on percussion on both sides, more marked on the left. Rales heard over entire left side and at apex of the right.

Present history.—Patient in about the condition described above. Cough is very distressing at night, and various remedies were given for the relief of this troublesome symptom, with only temporary effect. From this time on until the 1st of January, 1898, the case ran the usual course of such cases. At this time, however, there began to be noticed an œdema of the legs and scrotum and penis. This subsided at times and returned again. Later on the use of the lower extremities was lost entirely, and the anasarca became general. The urine, too, was but scantily secreted and hot baths were tried, but their beneficial effect was of very brief duration. The usual stimulating and nourishing treatment was given. Patient died of exhaustion.

Necropsy (eighteen hours after death).—Emaciation only moderate in degree. Numerous scars on various parts of the body, chest, and lower extremities. Legs, feet, penis, and scrotum are markedly œdematous, and the tissues exude serum on section. Heart appears normal. Right lung shows recent adhesions at the apex, also well organized adhesions to diaphragm and to pericardium. A large cavity was found at the apex, and the upper and middle lobes were full of tubercular nodules. The left lung was collapsed and was no larger than an orange; it was hollowed out into a cavity of about 150 c. c. capacity. Both kidneys were large, pale, and showed signs of fatty degeneration. The stomach and pancreas appeared normal. The liver was smaller than normal and there was a small abnormal process of liver tissue which partly replaced the gastro-hepatic fold of peritoneum. The liver structure was normal in appearance. The spleen was of normal size, but was so friable that it was torn in removal from the body. No other organs were examined.

C. H. G.

G. P.

CASE 2.

A. J.: aged 38 years; nativity, Russia: was admitted to the United States Marine Hospital, port of San Francisco, Cal., September 14, 1897, and died January 24, 1898.

History.—Patient stated that he was ill for six months prior to his entrance into the hospital, and during this time had lost 40 pounds in weight. Complained also of persistent cough, with copious expectoration, night sweats, and shortness of breath. Physical examination: Dullness over the apex of the left lung anteriorly to the second intercostal space; posteriorly, to the fourth dorsal vertebra. The percussion note over the right lung was normal. Upon auscultation moist and sonorous bronchial râles were heard over the whole chest. Examination of the sputum demonstrated the presence of tubercle bacilli. Heart was normal. The treatment was supportive and symptomatic, but, notwithstanding large doses of strychnia and digitalis were given, the patient gradually grew weaker, and died at 6 a. m. January 24, 1898.

Necropsy (five hours after death).—The body is that of a well-developed, though emaciated, adult white male. Rigor mortis fairly well marked. Encephalon normal. Weight of brain, 1,297 grams. The pericardial sac is normal. The superficial fat of the heart is increased, although the heart muscle and valves are normal; weight, 420 grams. The left pleura is adherent throughout. On the right side there are adhesions at the apex, otherwise the pleura is normal. Upon

section, the upper lobe of the left lung shows a cavity occupying the whole of its substance. In the upper part of the lower lobe are two small cavities; the remainder of the left lung is consolidated; weight, 1,400 grams. The apex of the upper lobe of the right lung shows numerous cavities from 1 to 4 cm. in diameter; remainder of apex is consolidated. Throughout the substance of the middle lobe are seen deposits of tubercular tissue, while the lung tissue in the lower lobe is normal; weight, 1,330 grams. The peritoneal cavity is normal.

The spleen is normal; weight, 247 grams. Kidneys enlarged; weight, right, 252 grams. In the upper part of the left a cyst, 2 cm. in diameter is seen; weight, 260 grams. The remainder of the genito-urinary tract is normal. The liver is normal; weight, 2,320 grams. The remainder of the gastro-intestinal organs are normal. The spinal cord was not examined.

R. R. H.
J. M. G.

CASE 3.

M. S.; aged 23 years; colored; nativity, Mississippi; admitted to the United States Marine Hospital, St. Louis, Mo., May 25, 1898; died June 27, 1898.

History—The patient had been sick for two months. He has had cough, dyspnoea, pains in his chest, muco-purulent expectoration, night sweats, fever, no appetite, diarrhea, and great weakness. His brother and sister died of tubercle. Physical examination: Body emaciated, depressions above and below clavicles, marked dullness over whole of right lung, especially the upper lobe, slight dullness over apex of left lung, bronchial breathing over right lung, inspiration quick and harsh, expiration prolonged; breathing the same over left lung, but not so marked; tubercle bacillii very abundant in sputum; a faint murmur heard after the second sound of the heart; an ischio-rectal abscess cavity exists on the right side of the rectum; this cavity has opened externally about an inch from the anus. This case ran the ordinary course of tuberculosis of the lungs and bowels, the end being hastened by the warm weather. He suffered mostly from high fever, rapid pulse, dyspnoea, diarrhea, and great weakness. On June 1, his right foot, leg, and thigh, as high as Poupart's ligament, became swollen, oedematous, and painful along the line of the large vessels. This swelling and pain, however, subsided by the 18th. Patient died at 2 p. m. on the 27th.

Necropsy (twenty-one hours after death).—Height 165 cm. Body greatly emaciated; abdominal wall $1\frac{1}{2}$ cm. thick, no fat. Pericardial sac contains 75 c. c. of straw-colored fluid. Heart flabby and soft. 13 by 12 by 6 cm.: tissue pale, small yellow clot extending from right ventricle through pulmonary artery; thickness of right ventricle wall 8 mm., of left ventricle wall 2 cm.; edges of mitral valve slightly thickened, other valves normal; weight of heart 285 grams. Right lung, apex adherent to walls of chest; weight 1,750 grams, 26 by 18 cm.; large gangrenous cavity in upper lobe 7 by 5 cm.; rest of upper lobe one mass of ulcerated tubercular tissues; remainder of right lung hard and tissues filled with gray tubercles. Left lung: Weight 900 grams, 24 by 16 cm.; tissue nodular, hard, non-crepitant, filled with tubercles; tissue of lung at border and small portion of apex crepitant, and only a few tubercles present. Spleen: Weight 570 grams, 16 by 13 by 7 cm.; slate color; tissue hard and full of gray nodules the size of a small marble. Left kidney: Weight 150 grams, 11 by 7 by 3 cm.; tissue dark red, pyramids distinct. Right kidney: Weight 175 grams, 12 by $7\frac{1}{2}$ by 4 cm.; appearance of tissue same as left kidney. Stomach 22 cm. long by 9 cm. broad; contains 25 c. c. thick, yellowish fluid; mucous membrane grayish-white, covered with mucus of the same color. Mesenteric glands hard and swollen, some as large as a pigeon's egg. Liver: Weight 1800 grams, 28 by 23 by 13 cm.; tissue on section very dark, almost black; 10 c. c. of brown-colored bile in gall bladder.

W. G. S.

CASE 4.

H. P.: aged 35 years; nativity, Cape Verde Islands; was admitted to the United States Marine Hospital, port of San Francisco, Cal., February 16, 1898, and died June 21, 1898.

History.—Patient said that he had night sweats, coughed a great deal, had had a hemorrhage and was losing weight. Physical examination showed that the patient was poorly developed and emaciated; the chest was well formed, the right side was somewhat fuller than the left. Movements were greater on the right side, while vocal fremitus was increased on the left side. Upon percussion, dullness of the right apex and of the entire upper lobe of the left lung, with impaired resonance of the lower, was elicited. Over the anterior area of the upper lobe, extending from the clavicle and the third rib the cracked-pot percussion note was obtained. On auscultation, bronchial breathing and moist râles were heard over the entire upper lobe of the left lung and over the apex of the right lung. Over the anterior surface of the upper left lobe there was amphoric respiration. Heart area was normal. There was an impairment of the systolic mitral sound, but its cause could not be determined. Liver and spleen were normal. Treatment was supportive and symptomatic. The patient had several hemorrhages, which were controlled by Magendie's solution and ergot. He slowly grew weaker until 4.15 p. m. June 21, 1898, when he died.

Neeropsy (twenty-four hours after death).—The body is that of a poorly developed and emaciated adult mulatto, male. Rigor mortis well marked. Encephalon normal. Weight of brain 1495 grams. Pericardium normal. Heart normal, although the myocardium is very pale and anæmic. Weight of heart 430 grams. At the base of the right lung and over the whole of the left lung the layers of the pleura are bound down by fibrous adhesions. The right lung is infiltrated throughout with the tubercular product. Weight of lung 1650 grams. In the apex of the left lung a large cavity is seen, while the inferior portion of the upper lobe and the superior portion of the inferior lobe appear normal. The base of the inferior lobe is consolidated and contains several cavities from 1 to 2 cm. in diameter. Weight of left lung 800 grams. The peritoneal cavity is normal. Spleen normal, weight 90 grams. Kidneys normal, weight of right 170 grams; left 250 grams. The remainder of the genito-urinary organs are normal. The liver is normal. Gall bladder distended with bile. Weight of liver 1795 grams. The remainder of the gastro-intestinal tract is normal. The spinal cord was not examined.

R. R. H.

T. B. P.

J. M. G.

CASE 5.

R. S. (colored), aged 32; nativity, Virginia; was admitted to the marine ward, St. Vincent's Hospital, Norfolk, Va., June 22, and died June 28, 1898.

History.—This patient had been admitted to the hospital several times previous to the above date suffering from tuberculosis. When admitted, June 22, he stated that his health had lately rapidly failed and that he had had several severe hemorrhages from the lungs. He was greatly emaciated; feet and legs swollen; fever every afternoon; pulse weak and rapid, and breathing very much embarrassed. He gradually grew worse until death.

Neeropsy (eighteen hours after death).—Rigor mortis slight. Body emaciated, feet and ankles swollen, brain normal, pericardium congested, and contained a small quantity of purulent fluid; heart in diastole and enlarged, and contained ante and post-mortem clots; no valvular lesions. Both pleura adherent—the right

almost entirely so. Both lungs nodular on external surface, and contained small tubercular masses and pus cavities. Liver large, but apparently healthy. Spleen large nodular, resistant on section. Omentum deficient in fat, but otherwise normal. Kidneys enlarged, mottled in color, and contained small nodules. Intestinal tract normal.

E. E. F.

CASE 6.

J. R.; aged 46 years; nativity, Pennsylvania; admitted to United States Marine Hospital, New Orleans, La., January 27, 1898, with tuberculosis of lungs; died March 19, 1898.

History.—Patient suffers from persistent cough, frequent hæmoptysis and general exhaustion. Previous history.—Present trouble began two years ago, subsequent to an attack of pneumonia, by severe cough and spitting of blood; continued to perform his duties as engineer up to two months ago, when patient was admitted to hospital at Cairo, Ill. Discharged at his own request, slightly improved, but after a short time cough became worse and frequent hemorrhages from the lungs occurred; about eighteen in number last month. Examination shows body emaciated, respirations hurried and weak, chest sunken and narrow, marked dullness over upper part of chest, vocal fremitus increased, rales over both lungs and evidence of consolidation in areas in both lungs. Expectoration profuse, purulent in character; cough severe, considerable dyspnoea; hæmoptysis in variable amount, almost a daily occurrence; considerable nausea and vomiting; general exhaustion. Attempts to control the hemorrhages by morphia, ice applications to chest and breast were made. The cough was decreased some by a squill cough sirup, and the patient became more comfortable. The hemorrhages from the lungs persisted; the irritability of the stomach continued, and the strength of the patient became gradually exhausted until death occurred at 8 p. m. on March 19.

Autopsy (fourteen hours after death.)—Œdema of feet and ankles; general emaciation; rigor mortis present; peritoneum normal; intestines free of adhesions; a few enlarged mesenteric glands; stomach and intestines normal; spleen normal, weight, 335 grams. Right kidney normal, weight, 137 grams; left kidney normal, weight, 130 grams; ureters normal. Liver, weight 2,120 grams; capsule of Glisson rather thicker than normal, otherwise liver appears normal; gall bladder and duct normal; bladder contains 75 c.c. urine, normal; brain apparently normal; pleura and pericardium adherent to chest wall. Left pleural cavity contains 400 c.c. of clear serous fluid, pleura thick and rough, visceral pleura studded with tubercles. Lung tissue consolidated at places and tightly adherent to chest wall; crepitation almost disappeared in areas. Right pleura presents the same condition, except there is no serous effusion. Adhesions old and tough. Lung tissue studded with tubercles, scattered over surface and throughout the organ in consolidated areas. Heart normal, except for the pale flabby condition of the muscular substance; weight, 255 grams.

H. H.

CASE 7.

W. P.; aged 38 years; nativity, Alabama; admitted to the Marine Hospital, Cairo, Ill., January 8, 1898; died January 28, 1898.

Clinical history.—Has had a bad cough during the last four months and thinks he has fever continuously; he suffers from dyspnoea on exertion; he expectorates large quantities of purulent matter, containing an unusual number of tubercle bacilli; there has been no hæmoptysis; the appetite is good, but he has lost considerable flesh; there was slight œdema of the feet and ankles; there is dullness over the upper half of both lungs and dry bronchial rales over the entire

chest. The temperature ranged from 38° to 39.2° C. up to the date of his death. On January 28 a congestion of the lower portions of the lungs caused death at 8.30 p. m. The urine contained a trace of albumen.

Necropsy (twenty-four hours after death).—General state of nutrition poor; rigor mortis marked. Brain: Dura mater thickened and opaque; sinuses contained clots, partly fibrinous; the vessels on the surface of the brain were distended with blood. Thorax: Thymus gland not found; large vessels distended with clots, also the cavities of the heart; the cavities were normal and valves competent. The heart walls were of normal thickness and color; they were quite firm. Lungs: The left was firmly adhered to the chest wall, the pleura being thickened by fibrinous deposit. This lung was filled with cheesy nodules and pigimentary deposit; there were two cavities of considerable size—one in the upper, one in the lower lobe. Upon cutting into the lung, thin yellow pus exuded. The right pleura presented a few adhesions, though much less firm than those of the left; the upper lobe was thickly filled with tubercles, and the remainder of the lung presented a few yellowish nodules scattered throughout. The lower portion of the lung, upon which the patient must have chiefly depended for breathing, was of dark red color from congestion. The great vessels, nerve trunks and diaphragm, were apparently normal. Abdomen: The omentum contained little fat and was of dark red color. The kidneys were slightly enlarged, weighing, right, 195 grams; left, 210 grams. There were no macroscopic changes. The adrenals were of normal size and appearance. The bladder and genital organs were normal. The liver was of firm consistence and presented a nutmeg appearance when cut. Weight, 1,875 grams; color, light brown. Spleen: Weight, 60 grams; diameter, $7\frac{1}{2}$ by 5 cm. The intestines presented quite a large number of ulcers with thickened edges, most of them of small size with no special relation to Peyer's patches. The mesenteric glands were enlarged and yellowish in color externally. The vermiform appendix was about 12 cm. in length, with mesenteric attachment through its entire length. Its cavity was patulous, but empty.

P. C. K.

CASE 8.

A. E. T.: aged 26 years; nativity, California; admitted to United States Marine Hospital, Stapleton, Staten Island, May 15, 1897; died November 26, 1897.

Previous history.—Was in this hospital about four months ago for inflammation of ethmoidal sinus. Since leaving he has been at work, though he has had fever daily. He coughs a great deal, and has lost about 40 pounds in weight during last year. Now has poor appetite, and his feet swell, especially in the afternoons. Bowels regular; is not vomiting; has had one or two chills recently. Numbers of tubercle bacilli found in his sputum, and the malarial organisms found in his blood (intracorpuseular form). The patient was put on quinine, cod-liver oil and malt, and alcohol, and later on creosote. His chills were finally controlled on the above treatment, but his general condition grew steadily worse. A physical examination made on October 16 showed the left lung throughout its upper portion infiltrated by the tubercular process; the right not so much so. On October 21 he developed considerable oedema about face, legs, and thighs. On the 22d he developed herpes zoster on right side, which occasioned him considerable pain and irritation. On November 21 he began to run high fever in the afternoon, coughed a great deal, and began to vomit and to have profuse night sweats. His strength rapidly failed, and he died at 2.45 a. m. on November 26, 1897.

Necropsy (eight hours after death).—Body of a white man, dark hair and moustache, blue eyes, about 5 feet 10 inches high. Poorly nourished, but not greatly emaciated. Rigor mortis present. Body livid over dependent parts and around ears and face. Calvarium not removed. Thorax: Pericardium contained about 50 c. c. of clear amber fluid. Heart considerably enlarged (weight 520

grams), the enlargement being mainly in left ventricle. Right heart chambers filled with dark fluid blood and clots; left not so much distended. Left auricle in its posterior part contained an organized clot. Mitral valve had one leaflet bound down, leaving valve incompetent. Other valves normal. Fluid in both sides of thorax. Lungs: Both lungs bound down by adhesion. The upper lobes of both lungs thoroughly infiltrated by purulent material, and the lung tissue breaking down into small cavities in several places. Lower portion of both lungs crepitant throughout and showed no evidence of disease. Abdomen: Omentum rather thin and dark. Abdominal cavity contained considerable fluid. Liver enlarged. Spleen enlarged and a very small accessory spleen found. Kidneys: Both kidneys alike: about normal size and somewhat pale; capsule stripped off easily, leaving a pale surface behind. On incision cortex found somewhat less than normal and the whole organ pale; ureters normal. All other organs apparently normal.

C. H. L.
G. W. S.

CASE 9.

J. H.: aged 36 years; nativity, Pennsylvania; admitted to United States marine hospital, Chicago, Ill., August 23, 1897; died November 3, 1897.

History.—About two years ago patient contracted a cold, but never consulted a physician until he presented himself at the outdoor department for relief from a troublesome cough. He was admitted to hospital, and the following noted: Cough is harassing at night and on rising in the morning; frequent night sweats and distressing shortness of breath; appetite is very capricious; expectoration is muco-purulent, at times tinged with blood, and very profuse; steady loss of weight and of strength. Supra and infra clavicular fossæ of both sides sunken. Patient greatly emaciated. Deficient expansion. Vocal fremitus is accentuated at the upper portion of each lung, more marked in the left. Dullness at the apices of both lungs, extending down to the fourth intercostal space on the left. Bronchial breathing and large moist rales at apex of right lung. Bronchial breathing, large moist rales at the apex of the left lung; lower down bronchial breathing and small moist rales on same side. The temperature never exceeded 39.2 C., ranging from 1° to 2° higher at night than in the morning. Tubercle bacilli found in the sputum in great numbers, also staphylococci. Treatment: Patient was put upon nourishing, easily assimilable food. Bowels kept open by laxatives and an occasional enema of warm water. The usual remedies were administered, including carbonates of creosote in increasing doses up to twenty decimeters after each meal. Stimulants when needed. In spite of treatment patient grew steadily weaker and the sputum continued to be loaded with bacilli.

Necropsy (twenty hours after death).—Male, 5 feet 7 inches high. Rigor mortis marked. Body pale, thin, and emaciated. Abdominal wall, in iliac region, greenish blue. Hypostatic congestion of shoulders and back. Abdominal organs found in normal relations without adhesions. Mesentery slightly congested, containing several enlarged glands, but free from fat. Small intestine distended with gas and containing a few small lumps of fecal matter. Large intestine empty. Appendix in normal position, but of unusual length, about 17 cm. Stomach slightly distended and contained about 500 c. c. of undigested milk. Liver weighed 1,800 grams; pale, friable, gritty to the knife when cut. Capsule nonadherent. Gall bladder normal, containing small amount of bile. Bile ducts without obstruction. Pancreas normal, weighing 90 grams. Spleen, also normal, weighed 310 grams. Left kidney in normal position, enlarged and congested. At the lower third of the inner border were found a few tubercles; weight, 350 grams. Suprarenal capsule normal; weight, 5 grams. Right kidney weighed 220 grams; relations normal, enlarged, congested; contained a small abscess

about the size of a pea in lower part: capsule easily detached. An adventitious vessel entered inner border 2 cm. below the hilum. Diaphragm normal and without adhesions. Thorax: Pleura of right side adherent to lung and chest wall. Pleura of left side adherent to lung and chest wall throughout its entirety; is very thin and easily torn. Right lung weighed 1,190 grams; considerable hypostatic congestion: apex contained a cavity the size of a hen's egg; walls irregular; body of lung firm and noncrepitant on pressure: studded with miliary tubercles. Left lung weighed 1,010 grams. Its upper three-fifths contained numerous small cavities: the remaining portion was firm, noncrepitant, and studded with miliary tubercles. Heart weighed (after opening) 320 grams; pericardial sac contained 155 c. c. of fluid: right ventricle filled with large ante-mortem clot: right auricle contained a small ante-mortem clot: heart muscle pale, flabby, without fatty infiltration. Blood vessels normal. Brain weighed 1,360 grams. Dura mater adherent to median fissure 25 cm., posterior to center. Vessels of pia distended.

J. B. S.

CASE 10.

H. B. (colored): aged 25 years; nativity, Louisiana: admitted to the United States Marine Hospital, New Orleans, La., April 4, 1898; died April 4, 1898.

History.—Was admitted at 4 p. m. April 4, 1898, and seen at 5.30 p. m. Patient was very weak; had dyspnoea and cough, slight expectoration, purulent in character; pulse very weak and rapid. Was given stimulants in the form of milk punch, but patient continued to lose strength, sinking into collapse, and died the same night. The history of this same patient on previous admission is as follows: Admitted February 16, 1898; discharged February 24, 1898, at his own request. Diagnosis: Tubercle of lung. On admission said he had been sick for the past two months with cough and shortness of breath; never had had a sickness worthy of mention. Examination: Has pectoral cough, expectoration chiefly mucus. Respiratory murmur interrupted and irregular on left side of chest: rales heard over same side. Was discharged improved.

Necropsy (sixteen and one-half hours after death).—General emaciation; rigor mortis present; pupils slightly dilated; superficial view of abdomen normal; peritoneum of walls normal; few adhesive bands on visceral peritoneum between loops of intestines; all mesenteric glands enlarged, varying in size from a pea to a hazel nut; few scattered tubercles on loops of small intestines noticed opposite attachment of mesentery. Weight of spleen 345 grams. Its surface is markedly tubercular; capsule is adherent. On section the spleen is studded with a mass of tubercles, most of which are beginning to undergo caseous degeneration. Weight of liver 1,740 grams. Color darkened; its surface is smooth, except in few scattered points where tubercles protrude beneath capsule: capsule is easily peeled, being found adherent at points where tubercular growth has begun. On section liver tissue is apparently normal, except for a few scattered points of small tubercular growths. Gall bladder normal. Gall ducts normal. Right kidney weighs 190 grams; pale; surface smooth; capsule nonadherent: on section is pale and anæmic and few small scattered tubercular masses. Left kidney weighs 190 grams; surface smooth, pale; capsule nonadherent: on section apparently normal. Ureters normal. Bladder and urethra normal. Vas deferens, seminal vesicles, and prostate gland apparently normal. Superficial appearance of chest shows protruding ribs and interspaces sunken. Left pleural cavity contains 300 c. c. fluid: surface is roughed from adhesions. Visceral pleura of left lung smooth except where a few adhesions were torn. The surface appears irregular on account of protruding tubercular masses beneath pleura. Weight of left lung 905 grams. On section has tubercular masses, large and small, scattered throughout its tissue, particularly in the upper lobe; right pleura has dense adhesions

over whole surface; lung does not collapse on opening pleural cavity at any point on account of dense adhesions between the visceral and parietal pleura; dense adhesions also occur between the lobes. Weight of right lung 1,310 grams; normal crepitus entirely absent. On section upper lobe present one large cavity involving the entire lobe. This cavity opens directly into a large bronchus, second branch from trachea. The tubercular abscess cavity is lined by a pyogenic membrane, and contains a slight amount of purulent fluid. The middle lobe presents numerous abscess cavities and large masses. The lower lobe appears nearly solidified; a few sections of this lobe sink in water, probably from tubercular pneumonia. Pericardium smooth; contains considerable pale, straw-colored fluid. Heart weighs 310 grams; small; pale on surface and on section; valves slightly thickened. Bronchial lymphatic glands all enlarged; tubercular. Pancreas weighs 82 grams; apparently normal on section. Brain weighs 1,240 grams; membranes of brain and brain apparently normal.

R. H. von E.

S. N.

CASE 11.

J. F.: aged, 34 years; nativity, New York; admitted to United States Marine Hospital, Stapleton, Staten Island, N. Y., April 26, 1897; died December 3, 1897.

History.—Complains of sore throat, which he has had several years; has cough of three months' duration. Has lost weight during the last three months. Has been drinking hard for several days and has taken little food during that time. Complains of weakness. An examination of his sputum showed numerous tubercle bacilli. Urine contained a heavy sediment, but no albumen. Patient was put on creosote, but showed no improvement, and steadily lost in weight. The latter part of June he began to have nausea and vomiting. He was put on an easily assimilable and nutritious diet with alcohol, but showed no improvement. On December 3 he had a sharp attack of dyspnoea, which was relieved by morphine. In the afternoon he had another attack and in a few minutes died.

Necropsy (seventeen hours after death).—Body of a white man, about 5 feet 8 inches high. Very much emaciated; rigor mortis marked; livid over back; calvarium removed and cranial cavity and contents found normal. Thorax: Heart pericardium contained about 50 c. c. of fluid; heart small and pale; both chambers contained considerable semifluid blood; valves normal. Lungs: Left closely bound down to chest wall; large cavity in the apex, the remainder of the upper portion of the lung infiltrated throughout with pus and contained several small cavities. Right lung not bound down so closely as left; the whole upper lobe infiltrated with pus and breaking down. Lower lobes of both lungs crepitant. Both sides of thorax contained small quantity of fluid. Abdomen: Small quantity of fluid in peritoneal cavity. Omentum long and had a fairly good deposit of fat. Both kidneys alike, normal in size, pale in color, firm to the touch; capsule stripped off, leaving a smooth surface. On section nothing abnormal observed except the paleness of the organ everywhere. Bladder contained about 150 c. c. of muddy urine; its mucous membrane slightly dark in color and its vessels injected in several places. Ureters normal. Spleen enlarged; liver normal; stomach and intestines normal.

C. H. L.

G. W. S.

CASE 12.

J. F. G.: aged, 34 years; nativity, New York; admitted to United States Marine Hospital, Stapleton, Staten Island, N. Y., July 23; died November 22, 1897.

History.—Was in this hospital three months ago in the tubercular ward; had improved some and felt well enough to go out. He now returns with his pulmonary condition worse; is vomiting a good deal, has diarrhea, coughing some,

profuse night sweats, losing flesh, etc. He was put on an easily assimilable diet, and after his vomiting ceased was given creosote in increasing doses, and some general tonics with alcohol. On this treatment he improved slightly, but in a few days his vomiting and diarrhea returned. From this time on, though he occasionally improved for a while, his tendency was steadily downward. Physical examination made on October 29 showed extensive involvement of left lung with a large cavity in upper lobe, and less extensive involvement of upper part of right lung. The patient's stomach at no time bore his food or medication well, and his treatment consisted mainly of symptomatic remedies, with nourishing food and alcohol. He became comatose on the morning of November 22 and died at 2.30 that afternoon.

Necropsy (sixty-nine hours after death).—Body of a white man, 5 feet 4 inches high; very much emaciated; dark hair, eyes, and mustache. Rigor mortis passed off; livid over dependent parts; œdema around ankles; calvarium not removed. Thorax: Pericardium contained small quantity of clear fluid. Heart rather small and pale, otherwise normal. Lungs: Left, contained a large cavity in upper lobe and the surrounding lung tissue was infiltrated with pus; right also contained a small cavity in upper lobe; both lungs bound closely to chest walls by pleural adhesions. Abdomen: Omentum very thin; cavity contained considerable clear amber fluid. Liver enlarged, hard on section, and gall bladder distended with bile. Spleen soft and pulpy and enlarged to some degree. Kidneys: Left, large (weight, 200 grams) and pale, its capsule stripped off easily, leaving a smooth, very pale (almost white) surface behind, on which could be plainly seen the small vascular circlets; the organ was elastic to the touch and cut clean and hard; the cortex greatly increased, and its pallid, yellowish appearance contrasted strongly with the purple red color of the pyramids; the right in all respects like the above except it was smaller (weight, 175 grams). Bladder contained small quantity of urine. Scattered in various places through the small intestines were several round or oval ulcers on a raised, hardened base. The glands scattered along the mesentery opposite these ulcers, enlarged, and on the outer (peritoneal) surface of the gut covering the ulcers were several collections of small white miliary bodies. Other organs apparently normal.

C. H. L.

G. W. S.

CASE 13.

J. A.: aged 40 years; nativity, Finland: was admitted to the United States Marine Hospital, Boston, Mass., November 13, 1897, and died December 15, 1897.

History.—He was in the hospital during the month of August, when he had a severe cough, profuse expectoration, the physical signs of tubercle of the lungs, and a diarrhea which could not be controlled. When admitted the second time, on November the 13th, he was much emaciated and completely prostrated. He had an intense racking cough, with very profuse expectoration; a diarrhea so profuse as to average twenty stools in the twenty-four hours; and physical examination revealed dullness, most marked at the apices of the lungs, and some cavernous respiration. Treatment produced but little effect and he rapidly wasted away, marked dyspnoea and delirium setting in a few days before his death.

Necropsy (fourteen hours after death).—Post-mortem lividity slight; rigor mortis moderate; emaciation extreme; pupils contracted. The heart weighed 280 grams. In each ventricular cavity was an ante-mortem clot, that in the right being the larger. All the valves were competent. The pericardial sac contained 22 c. c. of fluid and was normal. The left lung weighed 1,180 grams. There were a few adhesions at the apex of its pleural cavity. The organ was studded throughout with tuberculous nodules. At the apex was a large cavity, while the lower lobe was hypostatically congested and the seat of a large cavity filled with pus.

The right lung weighed 540 grams. Its pleural cavity was obliterated at the apex by adhesions. There was slight cavity formation in the upper lobe, and in the lower lobe there was hypostatic congestion, but less marked than in the other lung. The peritoneum was much congested, and the mesenteric glands were enlarged and indurated, and, on section, were seen to contain broken down caseous material. The small intestine was studded throughout with miliary tubercles, and its mucous surface was the seat of numerous large tuberculous ulcers. The liver weighed 1,420 grams and was normal throughout. The gall bladder was also normal. The pancreas weighed 115 grams and was normal. The left kidney weighed 180 grams; the right kidney weighed 175 grams; neither organ showed evidence of any morbid process. The urinary bladder contained 25 c. c. of urine and was normal. The suprarenal bodies together weighed 16 grams and were filled with tuberculous nodules. The spleen weighed 275 grams and was normal. The membranes of the brain were much congested. The brain weighed 1,510 grams and was normal.

H. W. W.

H. W. A.

CASE 14.

B. C. J.; aged 30 years; nativity, Norway; was admitted to the United States Marine Hospital, port of San Francisco, Cal., August 12, 1897, and died January 17, 1898.

History.—Seventeen months prior to his admission patient caught cold and has been coughing since that time. A week prior to admission he was compelled to go to bed, and the last three days of that time was spitting blood. Physical examination showed the patient to be a well-developed, though somewhat emaciated adult white male. The skin was sallow and upon the chest were seen numerous brown spots. The chest was well formed; the right side moved more than the left. Vocal fremitus was increased on the left side. Upon percussion, dullness was found on the left side, anteriorly as low as the fourth rib, posteriorly as far down as the third dorsal vertebra. The right side was normal except for a very slight dullness over the apex. On auscultation, bronchial breathing and moist rales were heard over the entire upper lobe of the left lung. On the right side, subcrepitant rales were heard over the apex. The heart area of dullness was enlarged downward and to the left. The apex beat was in the fifth intercostal space to the left of the mammary line. No murmurs were heard, but the second sounds, both aortic and pulmonary, were accentuated. The liver and spleen were normal. The sputum was examined and tubercle bacilli were found. Patient was put upon creosote. On the 25th of August he had a severe pulmonary hemorrhage, which was controlled by ice and magendie solution. On the 13th of September a reexamination of the chest was made which showed the dullness of the right apex to have increased, extending down to the second rib anteriorly and the fourth dorsal vertebra posteriorly. Dullness of left lung extended from the fourth rib in front to the fifth dorsal vertebra posteriorly. Pleuritic friction sounds were heard all over the left side of the chest. The patient remained about the same until January 15, when he had a severe pulmonary hemorrhage. He died at 1.07 a. m. January 17, 1898.

Necropsy (ten hours and a half after death).—The body is that of an emaciated adult white male. Rigor mortis is well marked. Encephalon is normal. Weight of brain, 1,295 grams. The pericardium is normal. Heart is normal; weight, 330 grams. Both layers of the pleura on the left side are firmly bound by old adhesions; on the right side the adhesions are more recent. The upper lobe of the left lung presents one large cavity about 8 cm. in diameter. Everywhere the remainder of the lung is infiltrated with the products of the tubercular inflammation. Throughout the lower lobe are many small cavities; weight, 595 grams. Throughout the right lung are present small areas of tubercular infiltration separated

from one another by distances of from one to three centimeters, the intervals being occupied by competent lung tissue; weight, 950 grams. The peritoneal cavity is normal. The spleen is normal; weight, 320 grams. Kidneys normal; weight, right, 170 grams; left, 190 grams. The remainder of the genito-urinary tract is normal. Liver is normal; weight, 2,400 grams. All the other organs of the gastro-intestinal tract are normal. The spinal cord was not examined.

R. R. H.

H. S. M.

J. M. G.

CASE 15.

F. H.: aged 24 years; nativity, Finland; admitted to United States Marine Hospital, Stapleton, N. Y., September 8, 1897; died October 15, 1897.

History.—No sickness since childhood; denies venereal troubles; uses tobacco and alcohol in moderation. Has been sick some months with general malaise and vague pains in his chest; began to have a cough in April, 1897, which has continued to present time; expectoration profuse and sometimes bloody; has had pain in throat recently when he swallows, his voice being hoarse. These, with dyspnea on exertion, are his chief symptoms. He did not lose appetite and has lost very little in weight. Has had no night sweats; bowels are regular; urinates normally; has had a discharge from right ear for several years. Patient's present condition appears fair; has a muddy complexion, clear tongue. Physical examination: Is not well nourished; more mobility on left than on right side. Patient somewhat emaciated; vocal fremitus marked on right side: slight dullness right side; breath sounds on left side exaggerated, scarcely heard on right side save in patches; moist rales high up in superior axillary region, right side: a few dry ones near lower end of anterior axillary line. Heart sounds normal. Throat examination shows a badly ulcerated epiglottis. Tubercle bacilli found in the thick purulent sputum. Urine examination negative. Temperature, pulse, and respiration about normal all the time; gradually grew worse. His inability to swallow, thirst, and sleeplessness were his worst symptoms. Although tonics, stimulants, and nourishing food were employed, he gradually failed, and died October 15, 1897, 4 p. m.

Necropsy (twenty hours after death).—Body of a white man about 24 years of age; light hair and eyes, fair skin; very much emaciated. Rigor mortis not present to any marked extent. Body livid over dependent parts. Calvarium not removed. Thorax: Pericardium contained about 100 c. c. clear amber fluid. Right chambers of heart distended, with clots; left contained a considerable quantity of semifluid blood. Organ normal in all respects except that it looked pale. Lungs closely bound down on both sides to chest wall; right contained a large cavity occupying nearly all of the upper lobe; the remainder of the lung substance disorganized; small cavities filled with pus scattered throughout. Left lung also contained a cavity in its apex, but not so large as the one in the right; the remainder of this lung was found in about the same condition as the other. Larynx contained considerable pus over its walls, and the epiglottis was ulcerated to some extent. Abdominal organs apparently normal, except kidneys, which were very dark, and considerable oozing from them took place on section.

C. H. L.

G. W. S.

CASE 16.

G. B.: aged 37 years; nativity, Island of St. Helena; was admitted to the United States Marine Hospital, port of San Francisco, Cal., November 29, 1897, and died December 6, 1897, at 3.30 a. m.

History.—On admission the patient gave a history of a slight cough and night sweats of a year's standing, becoming more marked during the last month. Physical examination: The right side of the chest is smaller than the left and the vocal

fremitus is increased on the left. On percussion dullness was found over the entire surface of the right lung and over the lower lobe of the left lung. On auscultation bronchial breathing was heard over the entire surface of both lungs, and over the apex of the right lung there was an amphoric quality to the respiratory sound. There were numerous moist bronchial rales. The heart was not enlarged, and the sounds, though weak, were normal. The liver and spleen were normal. Tubercle bacilli were found in the sputum. Under treatment the symptoms were somewhat ameliorated, but he rapidly grew weaker until his death.

Necropsy (twenty hours after death).—The body is that of a well-developed, moderately emaciated, adult, white male. Rigor mortis is well marked. The skullcap, brain case, sinuses, and vessels are normal. The meninges are normal, except for a few scattered miliary tubercles on the base of the temporal lobes. The brain is normal. It weighs 1,230 grams. The pericardium is normal. The heart is normal. It weighs 400 grams. The parietal and visceral layers of the pleura on the right side of the chest are covered with miliary tubercles and are everywhere adherent. The parietal and visceral layers of the pleura on the left side of the chest are covered with miliary tubercles. The pleural sac contains 1,200 cc. of blood-stained fluid. The right lung is everywhere tubercular. The upper lobe presents one large cavity occupying the entire substance of the lobe. Throughout the other lobes there are numerous cavities ranging in size from 1 to 3.5 cm. in diameter. The left lung is everywhere tubercular and is consolidated throughout, except for a small cavity 3.5 cm. in diameter at the center of the posterior inferior border of the upper lobe. Both lungs were firmly attached to chest walls and could not be removed except in small fragments. The omentum and peritoneum are thickly covered with miliary tubercles, and they present numerous adhesions. The spleen presents the condition of passive congestion, but is otherwise normal. It weighs 150 grams. The right kidney presents on section the condition of amyloid degeneration, the center pyramids being obliterated. It weighs 150 grams. The left kidney is normal. It weighs 120 grams. The genito-urinary tract is otherwise normal. The liver is normal. It weighs 1,500 grams. The digestive tract is normal. The spinal cord was not examined.

S. W.

J. M. G.

CASE 17.

R. W. (colored): aged 31; nativity, North Carolina: was admitted to the United States Marine Hospital, Boston, Mass., November 15, 1897, and died February 8, 1898.

History.—Both parents living. Habits good. During the past summer has had a slight cough, and has lost some in weight. Night sweats nearly every night. Sharp pain in left side. Never spit any blood. Eight days ago, after exposure, was seized with pain in chest, a great deal of coughing, and general prostration. Loss of appetite. Had chilly feelings. Pain in stomach. Bowels not moved for several days. Physical examination: Right side, dullness at apex in front and behind down to sixth rib. Fremitus increased, breathing diminished, voice exaggerated, a few fine rales. Left side nearly normal: has had pain.

November 19.—Soft blowing murmur detected at apex. Pulse good, soft, regular. Slight tenderness on deep pressure at McBurney's point. Tongue furred. Appetite poor. Bowels regular and watery.

November 21.—Temperature remains above 38°. No pain, little cough, bloody expectoration.

November 26.—Examination of sputum shows presence of tubercle bacilli.

February 7.—During the night patient was taken with some cramp, which left him in an exhausted condition. Died 10 a.m., February 8.

Necropsy (twenty-four hours after death).—The heart was contracted and weighed 300 grams. Valves were normal. The pericardial sac contained 80 cc. of fluid and was normal. The left lung weighed 950 grams and was bound to the thoracic wall by strong bands of adhesion all around, particularly at the apex. The organ was filled with tubercular nodules and contained very little air. The right lung weighed 1,850 grams, and had a large cavity in the upper lobe about 250 cc. capacity, and was infiltrated with nodules and very friable. Some small tuberculous nodules were found on the pleural surface of the diaphragm. The peritoneum was normal, but the mesenteric glands were slightly enlarged. Did not appear to be caseous. The omentum was normal. The stomach was small with walls thickened. The small intestine was smaller in caliber than normal, and contained very little fluid. The large intestine small; the rectum was full of hard fecal matter. The liver weighed 1,850 grams, and was slightly friable; the gall bladder contained 25 cc. of bile, and was normal. The pancreas weighed 120 grams and was normal. The spleen weighed 330 grams; rather friable, with capsule adherent. The left kidney weighed 260 grams; was congested. The right kidney weighed 225 grams. Their capsules were nonadherent. The suprarenal bodies were normal. The urinary bladder contained 100 cc. of urine, and was normal. The testicles were atrophied. Penis normal. The membranes of the brain were congested. The brain weighed 1,410 grams. Blood vessels were distended with blood; otherwise normal. Almost 10 cc. of fluid escaped while removing the brain.

H. C. R.

H. W. A.

CASE 18.

J. C.: aged 63 years; nativity, Ireland; admitted to the United States Marine Hospital, Cairo, Ill., March 12, 1898; died March 31, 1898.

Clinical history.—Was treated in this hospital from January 29, 1898, to February 14, 1898, for rheumatism. When admitted this time he complained of feeling very weak and of being unable to eat. He felt chilly, but had no distinct chills. Had not been able to work since leaving the hospital. He occasionally vomits what little food he is able to take. Physical examination: Radial arteries somewhat hard; heart's sounds feeble; no valvular murmur. The lungs give the normal resonance on percussion. Liver: Area of dullness diminished from normal.

March 25.—The same indefinite symptoms continue—the irregular range of temperature, from 37.5° to 39° C., weakness, and inability to take nourishment. There is very slight cough. The patient died March 31.

Necropsy (fifteen hours after death).—Rigor mortis present; no external evidences of disease, except the extreme emaciation. Brain: External surface presents several paccchionian bodies along the superior longitudinal sinus. The dura mater was quite thick and opaque. The subarachnoid space contained an excess of fluid. The brain tissue and sinuses presented a normal appearance. Thorax: The heart was of normal size and appearance; weight, 335 grams; walls, firm; valves competent, but mitral slightly thickened. Great vessels of thorax normal. Lungs: Weight of right, 1,138 grams; left, 1,448 grams. Both of these were firmly adhered to the chest wall at their apices. The upper and middle lobes of the left lung were completely filled with gray tubercular nodules, the lower lobe showing an earlier stage of miliary tuberculosis—small pearly bodies, pin-head size, thickly disseminated. This lobe, though permeable to air, was somewhat congested. The right lung was in a similar condition to that of the lower lobe of the left. The mucous membranes of the bronchial tubes were congested and thickened, but were almost free from pus and mucus. The great vessels, nerve trunks, and diaphragm were apparently normal. Abdomen: The vessels of the

omentum were somewhat injected. The spleen was swollen and purplish in color; weight, 300 grams. Its consistency was soft and the tissue easily torn. The pulp exuded freely on pressure. The kidneys presented under the capsule numerous pearly tubercles, and at one point a calcareous nodule under a surface cicatrix. These organs were of normal size, and presented no other appearance of disease. The adnexa were small and shriveled. The bladder and prostate were normal. There was congenital phimosis with adhesion of the foreskin. A slight stricture was found in the membranous portion of the urethra. The intestines were apparently normal. The stomach contained, near its pyloric orifice, an ulcer with smooth sloping edges, nearly circular in shape, and about 4 cm. in diameter. The mucous surface elsewhere was pale in color, with small areas of injected vessels. The gall bladder was distended with fluid bile. The liver was of light-brown color, rather small in size; weight, 1,800 grams. Other organs normal.

P. C. K.

CASE 19.

A. G.; aged 58; nativity, Canada; admitted to the United States Marine Hospital, Chicago, Ill., October 24, 1895; died April 12, 1898, at 10.45 p. m.

History.—Was admitted first on October 24, 1895, complaining of soreness over the abdomen and in the small of the back. He stated then that two years before he had had a pleural effusion on left side, and had been tapped three times, finally recovering. One year afterwards he commenced to have sharp cutting pains over the kidneys. On examination a diagnosis of floating kidney was made and he was operated on. The right kidney was found floating and was anchored to the muscles of the back with catgut ligatures. The wound healed nicely. The kidneys acted well, and the urine was normal, but the bowels were always constipated. On December 14 the wound was healed, but he still complained of pains in his side, and was very much emaciated. He was very carefully examined at this time—heart, lungs, and liver found to be perfectly normal. Spleen so small that it could not easily be distinguished. He continued in this state for months, taking morphine frequently on account of the pain, which now extended into the right iliac fossa and up into the back, being confined to bed all the time. Then he got a little better, and was up and around the wards for a few weeks. He soon returned to his bed again and slowly grew worse, the pain being with him constantly and the bowels being only moved by purgatives. On September 7, 1897, he was readmitted under the diagnosis of tubercle of the lung. About this time he had an attack of diarrhea, which the history states was the first spontaneous movement he had had in two years. His case ran along like that of all consumptives. Cough and vomiting were very troublesome, a great many remedies being given for the latter. Strong stimulation was given all the time, but morphine was often required. During the last of March and first of April his voice could hardly be heard, and he fell into a dull lethargy and gradually failed up to the date of death.

Necropsy (fifteen hours after death).—Body very much emaciated; weight about 80 pounds; slight post-mortem lividity; rigor mortis marked; pupils equal and slightly dilated; large bed sore over spine in lower scapular region. Heart weighed 280 grams. Pericardium adherent to anterior wall of chest and to lungs, obliterating the anterior mediastinum; otherwise normal. Aortic, pulmonary, mitral, and tricuspid valves competent and normal; wall of the right ventricle thin; ventricle dilated. Left ventricle showed excentric hypertrophy; other circulatory vessels normal. Respiratory organs: Nares, larynx, and trachea normal. Lungs: Left bound down to parietal pleura by dense adhesions throughout the entire surface; pleura much thickened; weight of lung, 1,030 grams; almost completely solidified; full of small tubercles. Right bound to parietal pleura, with dense adhesions; weight, 800 grams; very much solidified; full of

small tubercles; not so solid as the left. Abdomen: Peritoneum and omentum normal; stomach much dilated and contained 120 c. c. of greenish fluid; walls, cardiac, and pyloric openings normal; small intestines normal; cæcum and rectum contained a small amount of hardened feces; appendix very small and about 1 inch in length; free from adhesions. Liver: Weight, 5.280 grams; pale yellow in color, very friable, mottled yellow on section, very large, apparent fatty degeneration. Gall bladder distended with bile; duct patulous. Pancreas weighed 77 grams; normal and duct patulous. Kidneys: Left, weight, 160 grams; cortex reddish yellow, showing chronic parenchymatous nephritis; ureter and pelvis normal; no tubercles. Right kidney, weight 150 grams; cortex same as left; ureter and pelvis normal. Suprarenal capsules weighed 6 grams each; normal. Bladder contained about 70 c. c. of fluid; walls thickened. Prostate slightly enlarged; penis showed no scars; testicles atrophied. Spleen weighed 330 grams, pigmented, on section capsule adherent. Nervous system: Head narrow in front; scalp normal; skull of medium thickness. Brain weighed 1.420 grams; vessels, ventricles, and substance apparently normal. Solar plexuses not found.

M. H. F.

H. W. S.

CASE 20.

J. H.; aged 33 years; nativity, Kentucky; admitted to United States Marine Hospital at Louisville, Ky., October 26, 1897; died February 21, 1898.

History.—Mother died of tubercle. Father killed in battle. One sister living. No brothers or sisters dead. Man says he does not drink to excess. Has had hard and soft chancres as well as gonorrhœa. The patient coughs a great deal, and suffers from dyspnoea. Chest narrow and contracted. The sputa contains bacillus of tubercle. Patient is emaciated; appetite poor. Apex of right lung dull and flat. Creaking-leather sound and tubular breathing. Evidently a cavity in upper part of right lung. He died February 21, 1898.

Post-mortem (twelve hours after death).—Body small and emaciated. Rigor mortis. Large cicatrix on left shoulder from burn; also scar from some cause 4 cm. in diameter on lower part of sternum. There were no pathological lesions aside from those usually found in the body of a person dead from pulmonary tubercle. There were a few recent vegetations of valves of heart and an old hemorrhagic infarct in left kidney. The right lung contained several large cavities, and was so bound down by adhesions as to necessitate removal in sections. The pericardial fluid was normal in quantity and appearance. The heart valves were competent. The kidneys were contracted and hard, but not granular, at least their microscopical appearance did not show granulations. The capsules torn off instead of peeling readily. The liver was small and bled on section; its color was a chocolate brown. The brain small, but appeared normal, as were its membranes. Weights of organs: Brain weighed 1,460 grams; heart, 375 grams; left lung, 600 grams; right lung, 1,260, infiltrated with tubercle; liver, 1,740 grams; kidney, left, 190 grams; kidney, right, 195 grams; spleen, small and pale, 150 grams.

W. P. M.

CASE 21.

J. C.; aged 26 years; nativity, Ireland; admitted to United States Marine Hospital, Detroit, Mich., May 26, 1896; died February 13, 1898.

History.—Had been a patient in the hospital before and had gone out much improved, but returned in a worse condition. The history and rational signs made it positive that the disease was tuberculosis infection of both lungs. He continued to improve during the summer. In December he fell from a ladder, sustaining a fracture of the ulna and several contusions. He rapidly recovered from the results of the accident. Later, called attention to a tumor in the groin,

which he said he had had for a long time. An impulse was imparted to the tumor on coughing. The tumor lay below Poupart's ligament, and was diagnosed femoral hernia.

January 1, 1898.—The tumor has enlarged considerably lately, and he complains that coughing causes him pain in the tumor. There is fluctuation. Aspirated and 75 c. c. of thick, ropy puss withdrawn. Operation: Abscess opened, irrigated, and packed. About 100 c. c. pus in pockets. Pus had burrowed almost to knee. Lying loose in the bottom of the abscess cavity were several pieces of bone the size of the end of the little finger. Two openings were made for drainage. A small opening or sinus was found on the under side of the shaft of the femur leading to exposed bone. The saphenous vein was lying loose in the cavity and was ligated. Chloroform. The patient improved until January 21, when he had a severe diarrhea follow constipation. This condition was never controlled, and he gradually grew worse, dying of exhaustion.

Necropsy (twenty-four hours after death).—Body very thin. Rigor mortis well marked. No discolorations. Calvarium removed. Membranes and brain normal. Heart and great blood vessels normal. Lungs studded throughout with tubercles in different stages of softening. Pleura adherent over bases and apices of both lungs behind; only small cavities. Omentum very thin, and blood vessels can hardly be seen. No enlargement of mesenteric glands. The mucous coat of the stomach quite badly inflamed and covered over with a slimy, blackish mucus. Peritoneum perfectly normal everywhere, showing no protrusions at any point. The liver was somewhat anæmic. The common duct was distended at one point, this socculated portion containing muco-pus. Gall bladder distended above the normal. The fluid seemed normal. The head of the pancreas was much harder than normal. Spleen hard and capsule thickened. Both kidneys enlarged and each undergoing chronic, productive inflammation. Ureters, bladder, great blood vessels, and organs of generation normal. The abscess cavity opened up and thoroughly exposed. A sinus was found running upwards under the sheath of the psoas to the last lumbar vertebra and sacrum. The bodies of the vertebra were destroyed at the junction, and several of the vertebrae were diseased, undergoing necrosis.

J. O. C.

J. G.

CASE 22.

Tubercle of lungs and intestines.

L. C.; aged 42 years; nativity, Georgia; admitted to the United States Marine Hospital, St. Louis, Mo., November 22, 1897; died, January 20, 1898.

History.—This admission was the patient's second to this hospital. He was admitted November 8, 1897, under the diagnosis of "tubercle of lung," and, on request, was discharged November 11, unimproved. He was readmitted November 22, 1897, under the same diagnosis. The patient complained of a bad cold, which he contracted several months before, of a bad cough with profuse expectoration, of night sweats, and shortness of breath. There was no history of hæmoptysis. No tubercle bacilli were found in his sputum, though searched for many times. The patient also complained of a continuous pain in the abdomen, which came on about a month before his admission, accompanied by diarrhoea of a moderate degree. Physical examination: The patient is greatly emaciated. There is a sinking in above and below the clavicles. The fingers are "clubbed," the scapulæ "winged." Palpation: The epitrochlear, submental, and post-cervical lymphatic glands are enlarged. Tactile fremitus at the apex of the left lung is greater than is the normal. There is tenderness over the abdomen below the umbilicus. No tumor can be felt. No ascites or tympanites. Percussion: A higher-pitched note is elicited over the apex of the left lung with a tympanitic

area just below this. Auscultation: Vocal fremitus is increased over the apex of the left lung. On ordinary respiration the inspiratory murmur is rough, short, and wavy, the expiratory slightly prolonged and rough over the apex of the left lung. Many râles are heard at the end of inspiration over the whole chest. To the left of the sternum and 4 centimeters below the left clavicle a rough adventitious rhonchus is heard. On forced respiration the inspiratory murmur is very rough, as is also the expiratory, being bronchial in character. After a month the signs and symptoms on the part of the lung were much improved, the râles disappearing and the respiratory murmurs becoming more vesicular in character; but not so the pain in the abdomen and the diarrhoea, palliative measures neither relieving the one nor checking the other for any time. The patient lost 30 pounds in weight while in the hospital, notwithstanding the most nourishing diet and careful treatment. The last two weeks before his death he lost 15 pounds. The patient's condition gradually became worse till at half past 1 o'clock on the evening of January 20, 1898, when, appearing critical, the medical officer in command was summoned, but before anything could be done the patient passed away.

Necropsy (twenty hours after death).—The body is that of a negro, much emaciated, apparently 40 years of age; height, 5 feet 8 inches. The lips are covered with yellow mucus. No foreign material is seen in any of the body orifices. Rigor mortis is well developed. The eyelids are open, the pupils evenly dilated, the corneæ firm and transparent. There having been no symptoms of disease of the brain, it is thought unnecessary to open the cranial cavities. Thorax and abdomen: There is but little subcutaneous fat. The abdominal organs are in their normal positions. The intestines lie very far back. No foreign body is seen in the abdomen. The parts exposed are of a pale color generally, only the small intestines being slightly reddened. The diaphragm on each side reaches the lower border of the fifth rib. Thorax: On the left side there is a very firm adhesion between the base of the lung and the chest wall, the adhesion being 2 cm. thick. The pericardium contains 50 c. c. of a clear fluid. The heart is about the size of a man's fist and is very pale. On the anterior surface of the right ventricle there is a white spot 3 cm. long by 2 wide. The apex is moderately covered with fat. The right auricle contains 25 c. c. of fluid blood, the right ventricle 18 c. c., chiefly black and clotted. The left auricle and ventricle contain a small quantity of clotted blood. The valves are without alteration and are competent. The heart is 15 cm. long by 12 thick by 6 wide, and weighs 350 grams after the blood has been removed. The wall of the left ventricle is 1 cm. thick. The large veins of the neck are moderately distended with blood, the arteries being empty. The lungs seem large, and are of a dark-slate color with reddish mottling. On section, the apex of the left lung contains a large tubercular nodule 1.5 cm. by 2 cm., with numerous smaller nodules around it. Upon cutting this tubercle, its interior is of a black color, dotted with numerous chalky spots. This lung is 23 cm. long by 14 wide by 6 thick, and weighs 435 grams. The right lung is crepitant throughout, presenting no tubercular nodules. It is 23 cm. long, 15 wide, and 8 thick, and weighs 530 grams. The bronchial lymphatic glands are all greatly enlarged and are hard to the touch. On section, they are of a dark color with minute white spots. Abdomen: The spleen is of a dark slate color. It is 14 cm. long, 9 wide, and 5 thick, and weighs 190 grams. On section, it is uniformly red. The left kidney is easily stripped from its capsule. Its anterior surface near the hilum presents a decided bulge, which is firm to the touch. On section, the pyramids are few in number but well defined, one pyramid being contained in this prominence before mentioned. The cortical zone is narrow. This kidney is 13 cm. long, 6 wide, and 4 thick, and weighs 180 grams. The right kidney is 12 cm. long, 7 wide, and 3 thick, and weighs 170 grams. On section it presents nothing notable. The bladder is empty. The stomach is somewhat distended and contains 150 c. c. of

a pale yellowish fluid. There is no ulceration. The ileum shows several ecchymotic areas on its external surface, but no ulceration internally. There is considerable congestion at spots, the valvulae conniventes also being somewhat reddened. Peyer's glands are not ulcerated. The large intestine presents no ulceration or perforation externally or internally. It is moderately full of a yellowish fluid. The mesentery of the small intestines is one mass of enlarged glands. On section they are of a yellowish-white color. The liver is firm to the touch; its external surface of a pale brown color. On section it is uniformly red. It is 25 cm. long, 19 wide, and 13 thick, and weighs 750 grams.

R. C. C.

W. G. S.

CASE 23.

Tumor of cerebellum.

A. P.; aged 23 years; nativity, Tennessee; admitted to United States Marine Hospital, St. Louis, Mo., January 24, 1898; died June 4, 1898.

History.—The patient first began to have diarrhœa in November, 1897; at times he passed blood. He had had headaches since the middle of December and occasionally he would have attacks of dizziness. Physical examination: Body fairly well nourished, vocal fremitus increased over right lung and dullness found to be present over the apex. Inspiratory murmur short; expiration, long, wavy, and rough. No râles heard over either lung; faint murmur heard over apex of heart; liver and spleen not enlarged. Urine, specific gravity 10.20; no albumen or sugar present. Weight, 147 pounds. There was very little expectoration at first, so the tubercular bacilli were not found until after he had been in the hospital several weeks. On March 15 the patient had a convulsion; he became faint and had to lie down, when his arms and legs were seen to twitch. This lasted but a few moments and he apparently did not lose consciousness. He complained of dimness of vision, and, as he still had diarrhœa and headaches, his eyes were examined. White lenticular spots were found to be present in the retinae, and the arteries and veins were thread-like. Striations extended from the center of the disks, and the margins of the disks could not be made out. No evidences of hemorrhages could be seen. The patient had a lingering illness; he became greatly emaciated and gradually faded away. During the last month he was totally blind, but had no headaches or convulsions. He appeared to be in a stupor most of the time, although when aroused he would answer questions intelligently.

Autopsy (twelve hours after death).—Body greatly emaciated; light mulatto; height 182 cm. Very little rigor mortis present; scar 10 cm. long on right side between seventh and eighth ribs. A number of sores, varying from the size of a pea to a bean, found over the subscapular, axillary, and sacral regions. About 75 c. c. of straw-colored fluid found between membranes of brain. A blood clot was found lying on top of the right lobe of the cerebellum and the right side of this lobe was bound down to the skull. After the brain was removed from the skull a tumor was found occupying the whole of the right cerebellum. This tumor, 7 by 7 cm., soft and broken down on outside, harder inside, and of a yellowish-white color. Brain soft, weight 1,570 grams. No fat in abdominal wall; wall 1 cm. thick. Very offensive odor on opening abdominal cavity; intestines dark green color. Pericardial sac contains 75 c. c. straw-colored fluid. Heart 14 by 11 by 7 cm.; weight 270 grams. Right ventricle, thickness of wall one-half cm., contains white clot. Left ventricle also contains small white clot; thickness of wall 2 cm.; leaflets of mitral valve thickened and rough. Both lungs adherent to chest walls; impossible to remove them without tearing them to pieces. Lungs of a black color; tissue soft and easily torn, containing an enormous number of small tuber-

cles. Spleen 12 by 8 by 3 cm.; weight 130 grams, dark chocolate color. Left kidney 12 by 7 by 4½ cm.; weight 172 grams; structure normal. Right kidney 13 by 7 by 5 cm.; weight 170 grams; tissue very dark red. Stomach: greatest diameter 10 cm. Length 25 cm.; mucous membrane reddish-white; contains a yellowish fluid. Liver 28 by 20 by 9 cm.; weight 1,400 grams; color dark brown.

W. G. S.

CASE 24.

Tubercle of lung, double.

J. B.; age, 27; nativity, Cape Breton; admitted to United States Marine Hospital, Boston, Mass., July 13, 1896; died November 1, 1897.

History.—Family history good. Habits good. Has never had any venereal disease. Had double pleurisy about two years ago. Last March, a year ago, he injured his back lifting a heavy piece of wood, and since has had severe pain in lumbar region. Fourteen days before admission he noticed difficulty in walking; two days after noticed some numbness in legs. Bowels very constipated. No trouble in urination. He walks with a shuffling gait, and falls if he tries to stand with heels together. Patellar reflexes exaggerated, and marked ankle clonus. After admission patient grew steadily worse. In one week retention of urine began, and continued till death. There was rapid loss of flesh and strength; burning pains in legs, with marked contractions; absolute loss of sensation below umbilicus. About four months after admission he contracted a cough, and examination revealed dullness at apex of right lung, with fine and mucous rales. A month before death atrophic ulcers developed on buttocks and heel. Before death thighs flexed to right angles with body, and legs flexed on thighs with rigidity and spasm; there was marked lordosis in lumbar region, marked dyspnoea, flatness over upper part of chest, feeble cough and expectoration.

Necropsy (twenty-four hours after death).—Rigor mortis slight. Body very much emaciated. Sores on buttocks, over sacrum, and on left heel. Anterior curvature of spine in lumbar region. Thighs and legs are flexed to right angle, and require force to extend. Pericardium contained 40 c. c. of clear fluid. Heart weighed 260 grams, was rather pale, and of normal size. Both auriculo-ventricular valves were incompetent; aortic valves somewhat thinned. Beginning atheroma of aorta. Lungs: Left weighed 730 grams. Upper lobe full of tubercles in state of caseation; it contained a few small cavities. Lower partly consolidated and congested. Right weighed 810 grams; condition same as left, but not so marked. Both lungs adherent on all sides. The liver weighed 1,180 grams; fatty, friable, and contained a few small masses resembling tubercles. Gall bladder contained 12 c. c. of gall. Stomach was much distended, and contained 300 c. c. of chyme. It showed signs of chronic inflammation. Pancreas weighed 160 grams. Small intestine normal. Large intestine much contracted; cæcum distended with fecal matter. Kidneys: Left apparently normal; weight, 140 grams. Right contained a cyst in papilla near lower part; pale; there was some interstitial inflammation; weight, 160 grams. Bladder was much contracted; contained no urine. Spleen weighed 200 grams. Brain weighed 940 grams. Some opacities in pia mater, near longitudinal fissure. Cord: Membranes much thickened; substance semisolid, resembling thick pus; microscopic examination of this material showed pus, broken-down nervous elements, but no tubercle bacilli.

S. B. G.

H. W. W.

CASE 25.

Acute pulmonary tuberculosis.

J. C.: aged 35 years; nativity, Connecticut; admitted to marine ward, German Hospital, Philadelphia, Pa., December 2, 1897; died December 21, 1897, at 4 a. m.

History.—Some weeks prior to admission he was suffering from neuritis of left shoulder; on December 2, 1897, he was admitted to this hospital suffering from hæmoptysis, with much pain throughout the chest. The hæmoptysis continued until the time of death, daily, occasionally there being a few days interval. The amount expectorated was at times one-half liter, much mucous being intermixed, however. The physical signs of tuberculosis of the chest were very plain; the sputum was carefully examined daily for tubercle bacilli but they were not found until the day before death. In the last few weeks patient became much emaciated, losing rapidly in weight. Cough and expectoration were profuse. Night sweats cold in character.

Necropsy.—Body was rigid and in marked opisthotonos. Post-mortem lividity not well marked. Sugillation of the back. General nourishment was good, pupils were dilated, and rigor mortis was very marked and broken up only with much difficulty. The heart weighed, after opening, 340 grams. The pericardial sac was normal in appearance: the pericardial fluid was about 5 c. c. in amount, pale straw color. The aortic valve was competent, as shown by the hydrostatic test. At the base of the valves there was marked infiltration with calcareous material; the valves were stiff but could be accurately approximated. The mitral, tricuspid, and pulmonary valves were found competent and not altered in appearance macroscopically. In the left ventricle there was the usual proportion to right of four to one, and no macroscopical changes had taken place. The thoracic aorta was hardened and rigid, and the shape could not be altered without breaking numerous plates on its interior. The plates were calcareous and brittle, and the arteries showed atheromatous change, with the deposition of calcareous material. At the first turn of the artery after leaving the heart, it was noticed that it was much thinned, and upon holding it up to the light was translucent. On its exterior could be seen a slight bulging; this point corresponded with that portion of the artery where the full force of the systole drove the blood against its wall; at the base of this bulging there was found a calcareous deposit which extended entirely through the walls of the artery. Upon opening the artery, its entire length interiorly resembled alligator leather. The plates broke off readily and were quite sharp. The abdominal aorta showed nearly the same changes as the artery described above, though not to the same marked degree, except at the bifurcation, where there was heaped up a large mass of calcareous material. The brachial artery showed areas of calcareous deposit and atheromatous change in spots about the size 2 mm. The radial artery also showed small pin point of atheromatous change. The femoral artery also showed calcareous spots. The veins, so far as observed, did not show any degenerative changes. The mucous membrane of the nares was found somewhat reddened and swollen. The larynx and trachea showed no macroscopical changes. The middle mediastinal glands were much enlarged and softened; upon section they were found to contain many miliary tubercles, which were yellowish, and caseous in character. The peribronchial glands were also much enlarged and had undergone about the same degenerative changes as those described above. The left lung weighed 440 grams. A large cavity was found in the apex, ovoid in shape, being about 4 cm. in its longest diameter. The cavity was found to contain yellowish-green liquid. At the base was found a cavity of about the same general appearance as described above. Its anterior wall was lacking, opening on the free surface of the lungs; the entire mass was degenerated tissue and was tubercular in appearance. On close

inspection there could be seen numerous small arteries which had ulcerated through, red blood being noticed on the free surface, and evidently was the cause of some of the numerous hemorrhages. The destruction of lung tissue was so marked that the bronchi were all matted together and resembled a mass of pipe-stems closely tied. Throughout the entire lung were found many smaller cavities. The lung also contained numerous tubercles, most of them being cheesy in character, although a few were found showing evidence of calcareous deposits. At numerous points in the lung were found small areas of emphysematous vesicles. The left pleural cavity was found nearly obliterated by many dense adhesions, which were particularly well marked at the apex. The right lung weighed 840 grams. The general changes were as about described in the right lung, only not to so marked a degree. The largest cavity found was about a centimeter in diameter: this was situated in the lower portion of the middle lobe anteriorly.

Upon section in various directions many tubercles were found. The right pleural cavity showed only adhesions, which were apparently of recent origin and readily broken up. The peritoneum showed no macroscopical changes. The peritoneal fluid was pale straw color and about normal in quantity. The abdominal organs were all normal in their relationship to one another. The tongue was found slightly coated, pharynx slightly reddened in appearance. Oesophagus collapsed and contained mucus. The stomach was about the average size, holding 1,500 c. c. It also contained a small amount of caseous material. The cardiac orifice was about 3 cm. in diameter, the pylorus, about 2 cm. in diameter: no thickening was observed. The small intestine was slightly congested and contained a small amount of feces in the ileum. On careful observation no tubercles were found. The large intestine was very small in appearance, and on being filled with water, under pressure, could not be distended as much as the normal bowel. The rectum also appeared small, but was about of normal distensibility. The appendix veriformis was 15 cm. in length, very adherent and fibrous in appearance: no strictures were noted in its lumen. The liver was of a chocolate red color, weighed 1,800 grams, and upon section showed no macroscopical change. The gall bladder was much distended. The ducts were found patulous. Upon examining the interior nothing was found but a slight congestion. The pancreas was large in appearance, somewhat softened, showed nothing abnormal on section, and weighed 170 grams. The left kidney was found congested and weighed 170 grams: nothing abnormal on section. The right was also congested and weighed the same as above: the capsule was stripped with some difficulty. The pelvis and ureter were normal. The bladder was small, walls thick, prostate enlarged, urethra was normal in caliber and gave no evidence of stricture. The right suprarenal capsule weighed 5 grams and was normal. The left suprarenal capsule showed a small cavity in its interior, which was very ragged and tubercular in appearance. The spleen was somewhat enlarged and softened and weighed 320 grams. The scalp was covered by close growth of hair, the skull was very thick and hard, and the membranes of the brain were normal in appearance. The brain weighed 1,410 grams and nothing abnormal was noticed.

NOTE.—This death was evidently due to exhaustion from the numerous hemorrhages, which apparently came from a ragged cavity at the base of the left lung, and vessels of considerable size were opened. The man was in addition weakened by his fever, which was probably caused by the absorption of the toxins of the tuberculous areas, the largest of which was in the left pulmonary apex. The marked calcareous change which was found in the aorta, according to good authorities, was very rare in a man so young.

CASE 26.

Acute pulmonary tuberculosis.

J. B. A., aged 29; nativity, Pennsylvania; admitted to Marine Ward, German Hospital, Philadelphia, Pa., November 4, 1897; died December 22, 1897.

History.—Three weeks before he considered himself a perfectly healthy man, when he was awakened at night with a pain in his chest, and a few minutes afterward coughed up what he estimated to be at least one liter of frothy blood; from that time he became worse rapidly, having profuse night sweats, violent coughing spells, during which he expectorated a yellowish green sputum, nearly always streaked with blood. On admission to the hospital there was found nearly an entire absence of breath sounds over the whole left lung, dullness in percussion over isolated areas over the right lung. Tubercle bacilli were found in the sputum. At intervals of two or three days there were profuse hemorrhages from the lungs. Heart was found normal. The temperature was characterized by very high evening exacerbations and morning remissions, the difference often being 4° C. The last week of the disease the dyspnea was very marked, the patient being unable to assume the recumbent position.

Autopsy.—P. M. lividity could not be noted owing to the subject being colored. Rigor mortis was very slight. General nourishment was fair. Pupils were equal. Heart weighed 510 grams. The pericardial sac was adherent throughout its entire extent, leaving no vestige of the pericardial sac. The adhesion was very firm and had the appearance of being quite old, and could only be removed from the heart by tearing into the structure of the same. The walls of the sac were much thinned; pericardial fluid was, of course, not present. The aortic and pulmonary valves were found competent by the hydrostatic test; nothing abnormal was noticed about the cusps. The mitral and tricuspid valves were found in excellent condition. The right auricle and ventricle were filled with a post-mortem clot. The relationship of the thickness of the right ventricular wall to the left was well maintained, being about one to four. The thoracic aorta was found to contain spots of atheroma, which were situated generally at points which were distant from the vessel's branches. The abdominal aorta showed specks of atheroma at various points; no atheromatous spots were found at the bifurcation of the artery. The femoral and brachial arteries showed specks of atheroma. Nothing abnormal was noticed about the radials. The nares, larynx, and trachea were found normal in macroscopic appearance. The left lung weighed 690 grams. The pleural cavity was obliterated. There were many adhesions throughout its entire extent, but none of the adhesions were very firm, all of them being easily broken up with the fingers. The lung structure itself was found full of small emphysematous areas. Immediately around these were infiltrated areas of tubercular deposits. The right apex was found to contain a cavity ovoid in form about the size of a small hen's egg. The cavity contained a sero-purulent fluid; the walls were formed of what appeared to be necrotic lung structure. The entire lung was dotted with cavities which had the same characteristics as the one described above, all varying in size from about two millimeters to a centimeter. The right lung weighed 1,000 grams. The pleural cavity was found normal throughout, no adhesions being found. The lung itself contained in its apex a cavity about the size of an English walnut. Numerous smaller cavities were found, but the destruction of lung tissue was found not to be nearly so marked as in the left lung. Throughout both lungs were found many miliary tubercles, all of which were cheesy in character. The cavities contained a yellowish, green liquid about the consistency of blood serum. The abdominal organs on opening the abdominal cavity were all found in normal relationship. The peritoneal fluid was of a pale straw color, and about normal in amount.

The peritoneum was found shiny, smooth, and transparent. The tongue was coated brownish white. Pharynx normal. The cesophagus was patulous throughout, and presented no gross lesions. The stomach was found nearly empty, a few small curds of milk and about 2 c. c. of yellowish-green liquid were observed. The pyloric orifice was about 2 cm. in diameter. The cardiac orifice was about 3 cm. in diameter. The small intestine in the ileum contained three ulcers which were oval, long axis being situated transversely, and on the side of the mesenteric attachment the edges were hard and infiltrated, and in these were found several small tubercles. The appendix vermiformis was found deeply congested at the distal portion. On opening the appendix at the distal portion an ulcer was seen, which had for its base nothing more apparently than the serous coat of the peritoneum. The edges of the ulcer were hard, much thickened, and much infiltrated. In the sigmoid flexure an ulcer appeared which was about the same in character as the ones described in the ileum. The base of the ulcer involved the muscular coat. The rectum was found patulous. The liver weighed 1,800 grams; was chocolate red in color, and on section revealed nothing abnormal. The gall bladder and ducts were found patulous, no stones being found. The mucous coat of the gall bladder was somewhat roughened. The pancreas weighed 110 grams, was soft in character. The left kidney weighed 160 grams; nothing abnormal could be detected macroscopically. The right kidney weighed 170 grams, and was found normal on section. The pelvis and ureters were found patulous throughout. The bladder appeared much larger than normal, and contained about 150 c. c. of urine. The prostate gland was not found enlarged. The membranous portion of the urethra was congested. The left suprarenal body weighed 9 grams. The right suprarenal body was triangular in form, and weighed 7 grams. The scalp was well covered by a good growth of shortly cropped hair. The forehead was rather low. The skull was very thick. The membranes of the brain were normal, and the brain weighed 1,380 grams. The spinal canal cord and membranes were not examined.

F. I.

CASE 27.

Acute tuberculosis.

I. H. (colored), aged 33 years; nativity, Tennessee; admitted to the United States Marine Hospital at New Orleans, La., August 13, 1897; died, April 21, 1898.

History.—On admission had an ulcer of penis and bubo of right groin. The ulcer was of five months' duration, the bubo was suppurating and had ruptured, leaving an angry looking ulcerating surface. There was also a chancroid of corona of five months' duration and beginning suppurating gland of groin. This was incised and dressings applied to the ulcers. On the 17th of August patient first complained of tenderness over the bladder, passed urine frequently, accompanied with straining; temperature 38.4°; pain continued at neck of bladder and along the urethra. Has continual desire to urinate. No sudden stoppage of urine and no gravel. Milk diet and diuretics given. Several days after this patient passed some muddy looking urine, followed by 50 c. c. of pus. Felt perfectly relieved after this. Irrigation of bladder begun and continued with good effect, many symptoms disappearing. Examination of urethra shows stricture about 3 inches from meatus, tight, annular, moderate calibre and not thick. Examination per rectum showed some tenderness around neck of bladder and prostate; there was also a small inflamed external pile. By the end of the month the ulcers were healing, the pain and tenderness of bladder had disappeared, no straining on micturition, makes urine regularly, and can hold bladder full without discomfort. Urinary analysis: Acid reaction; specific gravity, 1.009; color, amber; slight amount of albumen. The short period of relief was soon followed

by the onset of pain, referred to left inguinal region and back, a "pinching sensation" at seat of stricture, and tenderness in upper part of rectum. There is a distinct mass, palpable through abdominal walls, adherent to rectum or lower end of colon. Pressure of this causes pain that "shoots through" to the back. Straining at stool, and blood in small quantity. Milk diet, rest in bed, and cathartics. After several days a further examination showed some hard tumor in left inguinal region: no fluctuation; tender. The mass extends as high up as level of umbilicus and within 2 c. m. of median line; from there to the left occupying the left lumbar and inguinal regions. The mass is irregular, very little or no movement: on pressure causes pain in rectum to anus. Has considerable pain with full bladder in morning or before passing urine, and the pain disappeared immediately after micturition. Examination of urine: Amber color, considerable sediment of pus, acid reaction, specific gravity, 1.012. Stricture was dilated; bladder explored with negative results. Bladder not tender at all. Provisional diagnosis: Pyelitis is made, with idea that the ureter had become stopped up with pus and suddenly gave way. Opiates given to relieve pain. Sounds passed daily, 16.017, English. Milk diet; rest in bed; salol .6 gm., three times a day. Improved daily: less pus in urine; no pain on micturition; gaining strength.

October 27.—While having a normal movement of bowels noticed "warm blood trickling" from urethra, 4 c. c., then when he urinated had a pain at seat of stricture, and an attempt to urinate caused some pain at the point of stricture which "seemed to be swollen and prevented urine from coming out"; after fifteen minutes urine ran freely. The same symptoms continued, with an occasional clot appearing in urine. The clot caused a temporary obstruction to passage of urine.

November 8.—No evidence of tumor; tenderness remains on deep pressure in region between kidney and bladder. Bladder washed out. Toward last of washings, like the last of urinating, the water is muddy with pus, and inclines one to the belief that patient has had an abscess at neck of bladder either in prostatic or infravesicular. As usual, however, no tenesmus and but little tenderness exists. Amount of urine in twenty-four hours, 1,500 c. c.

November 20.—Has been improving daily. Complains of shortness of breath; no cough; pain in muscles of back. During the month of December, 1897, continued about the same. Still passing some blood and some pus in urine; has no difficulty in micturating, except when a clot stretches the urethra. Has occasional chills. Temperature range between 38° and 40° during last three weeks of month. Quinine had no influence on temperature. During the month of January the fever continued about the same. Had pain in left lumbar region most of time. Treatment: Attention given to all emunctories and symptomatic. He continued about the same during February, with slight improvement. March examination: A No. 16 English sound passed; some roughness and tightness at prostate, no urethral stricture apparent; bladder contracted; holds at most 140 c. c.; some granular detritus washed out; passes urine frequently, twenty-five times during the night, attended with more or less straining; no pus forced out. Examination per rectum shows enlarged prostate, chiefly middle and left lobes involved. Developed some diarrhea during this month. Temperature was variable, ranging between 37° in the morning and 39° to 39.5° during the evening. During April complained of continuous pain in penis, about 2 inches behind meatus, frequent micturition, every fifteen minutes, tenderness over bladder and left inguinal region. Diarrhea became troublesome, fever increasing; had irregular chills. Rapid emaciation followed; the patient grew weaker daily. During the last week the temperature did not rise above normal, he was in a collapsed state, pulse imperceptible, a cadaveric odor about his body developed, and he finally died of exhaustion.

Necropsy (fifteen hours after death).—Rigor mortis in legs, face, and shoulders. General emaciation. Livores over left shoulder and back. Pupils slightly

dilated. Superficial appearance of chest shows marked emaciation, intercostal spaces sunken. Pericardial sac apparently normal. The heart weighs 370 grams; small and pale and is rigidly contracted. Left ventricle is empty. Its walls are markedly thickened. Right ventricle contains some dark blood and a large buffy clot. Valves apparently normal. Respiratory organs: Nares contained a clot of blood from recent hemorrhage. Left lung weighs 440 grams. Its surface grayish, and presents patches of extravasated blood scattered over its posterior surface. It crepitates normally. On section, the lung appears to be filled with a pale red, frothy liquid. Numerous miliary tubercles are scattered over the whole cut surface in both lobes. Right lung weighs 480 grams. Few adhesions at apex and at the base to the diaphragm. Its surface is grayish white and has scattered black pigmented spots. On section, a frothy fluid oozes from all points. Numerous miliary tubercles are scattered over the whole cut surfaces in all three lobes. Pleural surfaces smooth and glistening, and normal except at points where adhesions occurred on right side. Bronchial lymphatic glands at root of both lungs were enlarged and tubercular. Superficial view of abdomen reveals nothing abnormal. Peritoneum smooth and glistening and in general appearance normal. There are a few peritoneal adhesions to the surface of the spleen. Stomach appears small and collapsed. Small intestines empty. Large bowel slightly distended. Sigmoid colon and rectum contain fecal matter. Liver weighs 2,250 grams, large and dark red in color. Its surface is irregular and markedly tubercular. On section, liver presents disseminated miliary tubercles, many of which are beginning to undergo caseous degeneration. Lymphatic glands in region of transverse fissure gastro-hepaticomentum are tubercular. Gall bladder and gall ducts normal. Pancreas weighs 60 grams, apparently normal. Spleen is very much enlarged, its surface appears nodular from aggregated tubercles. On section, presents disseminated miliary tubercles. Its weight is 855 grams. The lymphatic glands of the spleen occupying its hilum were all much enlarged from tubercular infiltration.

Left kidney weighs 180 grams. Its surface is smooth and slightly pigmented. On section, appears pale and anemic, and shows few scattered tubercles. Right kidney weighs 210 grams. Surface is markedly tubercular, at some points undergoing cheesy degeneration. On section, presents numerous disseminated tubercles, varying in size from a pea to a walnut, the larger ones containing pus on section. Lymphatic glands in abdomen and pelvis are all enlarged—apparently tubercular. Right supra-renal capsule weighs 15 grams. A tubercular mass involves this capsule, so that very little normal tissue is seen. Left supra-renal capsule weighs 2 grams; appears normal. Ureters apparently normal. Bladder contains about 100 c.c. of urine. The bladder walls are much thickened. The mucous membrane of bladder shows numerous ulcerated spots covering its whole surface. At the upper left angle of bladder is seen an opening which may be traced to be continuous with a suppurating tract. This tract courses over the iliopectineal line close to left sacro-iliac synchondrosis, over the upper surface of psoas muscle to level of second lumbar vertebra. The peritoneum and fascia covering the psoas muscle separates the tract from the abdominal cavity. Opening into the tract at its origin in the pelvis is a large suppurating mass, which seems to be a tubercular abscess of the prostatic gland. The prostate gland and both seminal vesicles are tubercular. The entire left epididymis was tubercular. At globus major was a large tubercular abscess. Left testicle also tubercular. Right epididymis felt thick and hard. Right testicle apparently normal. Brain apparently normal; weight, 1,379 grams. Primary cause of death, general acute tuberculosis. Secondary cause, exhaustion.

R. Von E.
H. R. C.

CASE 28.

General acute tuberculosis.

J. G.: aged 48 years; nativity, Ohio; admitted to United States Marine Hospital, New Orleans, La., September 16, 1897; died April 28, 1898.

History.—On admission complained of pain, sudden and cutting pain in side and back: first occurred one week before admission; has had no chill, not much cough, and had had a similar pain on left side two months ago. Appetite poor, no nausea or vomiting, constipated, skin clear of eruption; vaccinated on admission. Temperature 38.5 C. Examination shows inflammation of left lung, increased fremitus, dullness, increased vocal resonance, and crackling rales with diminished respiration on left side over upper lobe: along base of right lung some pleuritic friction, roughening, otherwise negative. Father died of severe and chronic cough, and lost a great deal of flesh. One sister has same complaint. Patient developed an irregular remittent fever, maximum temperature being 39.2 C. Cough continued, expectoration variable, being sometimes very free and streaked with blood, pain continuous in chest: crackling rales heard over whole left lung, dullness, and decreased respiratory murmur, which became afterwards increased. Tongue continually coated, appetite very poor, bowels became loose, stools diarrhæal, circulation poor, irregular chills, and night sweats; general weakness and emaciation soon developed. Death due to exhaustion.

Necropsy (one hour and ten minutes after death).—Rigor mortis in lower jaw, Marked general emaciation. Pupils of medium size. Superficial appearance of chest shows considerable emaciation, ribs standing out prominently. Pericardium apparently normal; contains about 100 c. c. of pale straw-colored fluid. Heart weighs 360 grams; flabby; fat over the right ventricular wall, apex, and part of surface of left ventricle. On section the left ventricle contains blood and clots, dark in color. The right ventricle contains very little blood. Valves apparently normal. Respiratory organs: Nares and larynx normal. Left lung weighs 705 grams. Its surface is rough and torn from separation of the adhesions, which were so thick that there was great difficulty in the removal of the lung. Numerous openings leading into small and large cavities may be seen over the whole surface. On section the whole lung appears diseased from diffuse miliary tubercles. Also numerous small suppurating cavities, lined by tubercles which have ruptured and others about to ulcerate, may be seen scattered over the cut surface. The largest cavity was at the apex, which involved nearly the whole lobe. Right lung weighs 700 grams. Superficial surface appears darkly pigmented; feels nodular to the touch. On section the cut surface presents numerous miliary tubercles. Considerable pale-red frothy fluid exuded from the cut surface in middle and lower lobes. The pleural surface on right side was smooth, except at points where adhesions occurred on the posterior surface and over the diaphragm. Bronchial lymphatic glands of both lungs were tubercular. Those at root of left lung were much the larger. Superficial view of abdomen shows nothing abnormal. On section the abdominal walls are very thin; the muscles are anæmic and pale; no subperitoneal fat visible on section in median line. Peritoneum apparently normal. Stomach normal. Small and large bowel normal. The mesenteric glands high up in the abdomen, and those in the lumbar region were enlarged and tubercular. Liver weighs 1,490 grams. External surface smooth, dark red in color. On section it presents scattered minute tubercles. Lymphatic glands in gastro-hepatic omentum feel shotty. Spleen weighs 320 grams. External surface apparently normal. On section numerous scattered minute tubercles are seen over whole of cut surface. Left kidney weighs 185 grams. Its surface presents few tubercles under the capsule. On section there are some scattered tuberculous nodules throughout the tissue. Right kidney

weighs 175 grams. Few tubercular nodules seen on section. Ureters apparently normal. Bladder contains about 100 c. c. of clear urine. Its walls are thick. The prostate gland seems normal. The seminal vesicles are much enlarged and tubercular. The seminal duct is large. The tunica vaginalis on left side is adherent to the testicle. The left testicle on section shows a large tubercle abscess. The right testicle is apparently normal. Brain weighs 1,355 grams. Its membranes and tissue are apparently normal. Primary cause of death, general tuberculosis; secondary cause of death, exhaustion.

R. VON E.

H. R. C.

CASE 29.

Tubercle of lungs and brain.

J. S.; aged 35 years; nativity, Maine; admitted to the United States Marine Hospital, Boston, Mass., May 21, 1898; died June 27, 1898.

History.—On admission to the hospital gave history of intermittent chills and fever with sweats every third day. Tongue coated, appetite poor, bowels constipated. Temperature 38° C. For a week he had a slight evening temperature and said he felt pretty well. May 31 he had a chill, followed by a temperature of 40°, which gradually declined, reaching normal in three days. Next it began to rise, and in two days reached 40°, and ranged between 38° and 40° till his death. June 2 he had a profuse hemorrhage from his lungs, another on the 3d. and two on the 4th. Had small hemorrhages every day till June 1. Sputum did not show the tubercle bacillus till June 10. Urine smoky. Died June 27.

Necropsy (twenty-one hours after death).—Post-mortem lividity marked and rigor mortis slight; general nutrition fair; pupils normal. Heart weighed 375 grams and was flabby; valves competent. Left lung weighed 1,475 grams; lower lobe nodular and upper crepitant to the feel; caseous masses in upper lobe and miliary tubercles throughout; left pleural cavity contained 1,000 c. c. of fluid with adhesions at the apex. Right lung weighed 1,300 grams; upper lobe nodular; miliary tubercles throughout; bronchioles filled with frothy mucus. Stomach contained a little chyme. Intestines empty and distended with gas; a small quantity of feces in the sigmoid flexure. Liver weighed 1,650 grams and was pale. Pancreas weighed 45 grams. Right and left kidneys each weighed 200 grams and were normal. Bladder was empty. Spleen weighed 220 grams. Dura mater was congested and there was some serous effusion in the subdural space. Brain weighed 1,450 grams; deposit of miliary tubercles along the longitudinal fissure.

H. W. W.

CASE 30.

Tubercle (general).

H. A.; aged 47 years; nativity, Finland; admitted to the United States Marine Hospital, Boston, Mass., May 17, 1898; died June 9, 1898.

History.—Had been previously treated during winter of 1898 for enteric fever, and was in this hospital from March 19. to April 20, 1898, with an aortic insufficiency; he left the hospital on his own request, his condition being improved. On reentrance there was emaciation, anorexia, and weakness. Physical examination showed infiltration of right lung, limited respiration on right side, and aortic murmur. After temporary improvement patient began to decline steadily. Alternate constipation and diarrhoea; May 22, left testicle swollen and painful, but subsided under treatment; at same time slight urethral discharge, but patient firmly denied gonorrhœal history; June 4, suppression of urine, catheter being used till death. Death easy on June 9, at 8 p. m.

*Necropsy (fifteen hours after death).—*Marked post-mortem lividity; rigor mortis slight; greatly emaciated; pupils dilated. Heart weighed 290 grams; pericardial sack contained 10 c. c. of fluid; aortic valves thickened; heart muscle flabby and right side somewhat distended with venous blood. Ascending aorta and arch enormously dilated, walls greatly thickened and inner coat thickly studded with miliary tubercles. Left lung, 1,390 grams; pleural adhesions at apex, posterior, border, and base; crepitant to feel, and studded throughout with miliary tubercles; caseous mass, 4 cm. in diameter, in apex. Right lung, 780 grams; everywhere adherent to thoracic wall; tough on section; a mass of miliary tubercles with caseous masses scattered here and there. Liver, 1,490 grams, miliary tubercles throughout. Spleen, 320 grams, slightly tuberculous; small supernumerary spleen near the hilum. Other abdominal viscera normal. Left kidney, 240 grams; capsule adherent, with tubercular deposit abundant beneath and scattered through the parenchyma. Right kidney, 190 grams, also tuberculous, with densely adherent capsule. Bladder wall thickened, mucous membrane hypertrophied and somewhat congested, and contained a small amount of turbid urine. Left testicle enlarged and contained a quantity of thick pus; 25 c. c. of clear yellow fluid in cavity of tunica vaginalis. Brain membranes pale. Brain, 1,470 grams; abundant tubercular deposit along the longitudinal fissure; serous effusion in the subdural and subarachnoid spaces.

H. W. W.

CASE 31.

Cirrhosis of kidney.

A. N.; aged 38 years; nativity, Peru; was admitted to the United States Marine Hospital, port of San Francisco, Cal., December 5, 1897, and died February 10, 1898.

History.—Patient had had a sore throat with cough, loss of weight, and pain upon swallowing, for five months. Physical examination showed that the chest movements were equal; vocal fremitus normal. On percussion, slightly impaired resonance of the upper lobes was found, especially of the left. Upon auscultation, inspiratory sounds were harsher and more prolonged than normal and moist bronchial râles were heard. The heart, liver, and spleen were normal. The throat showed evidences of inflammation. On February 9, 1898, a reexamination was made and upon percussion dullness of both apices with impaired resonance of the entire left lung was found. Over the lower lobe of the left lung pleuritic sounds were heard. The sputum was examined repeatedly, but the tubercle bacillus was not found. The treatment was stimulative and symptomatic, but the patient gradually grew weaker and died of inanition at 3.30 p. m. February 10, 1898.

*Necropsy (nineteen hours after death).—*The body is that of a poorly developed and emaciated adult mulatto male. Rigor mortis well marked. Encephalon normal. Weight of brain 1,580 grams. The pericardium is normal. Heart normal; weight, 250 grams. At the apex of the right lung and the apex and base of the left lung are fibrous adhesions. Otherwise the parietal and visceral layers of both pleuræ are normal. The left lung upon section shows tubercular infiltration of the upper lobe, while the lower lobe is congested and infiltrated, but to a less degree; weight, 910 grams. Right lung is deeply congested, while throughout its substance are seen areas of tubercular infiltration; in the upper lobe are two cavities, one 2 cm., the other 1 cm. in diameter; weight, 770 grams. The peritoneal cavity is normal. Spleen is normal; weight, 130 grams. Left kidney is very small, although all the pyramids are intact; weight, 97 grams. Right kidney shows evidences of an old interstitial nephritis; some of the pyramids are

absent; weight, 93 grams. The rest of the genito-urinary organs are normal. Liver is normal; weight, 1,270 grams. Gall bladder distended with bile. The remainder of the gastro-intestinal tract is normal. All organs show evidences of marked anæmia. The spinal cord was not examined.

R. R. H.
W. M. J.
J. M. G.

CASE 32.

Dilatation of heart, general; emphysema.

L. C.: aged 56 years; nativity, Germany; was admitted to the United States Marine Hospital, port of San Francisco, Cal., December 6, 1897, and died February 11, 1898, at 4.30 a. m.

History.—On admission the patient complained of weakness, shortness of breath, and of cough with profuse expectoration. Physical examination: Patient was well developed and well nourished. The chest was barrel-shaped; its movements were equal, but deficient. On percussion of chest no dullness was found, but over the greater part of the lung a hyperresonant note could be elicited. On auscultation numerous moist râles were heard. The heart was enlarged downward and to the left, the apex beat being situated 4 cm. to the left of the mammary line in the fifth intercostal space; sounds normal. The liver and spleen were not enlarged. Under treatment his symptoms were temporarily improved, but subsequently grew worse until his death.

Necropsy (nine hours after death).—Body is that of a well developed, well nourished adult white male. Rigor mortis is well marked. Encephalon is normal. Weight of brain, 1,420 grams. The pericardial sac contains 300 c. c. of clear fluid, but is otherwise normal. The heart is dilated, the right ventricular cavity being nearly double its normal size. The valves are normal. Weight, 410 grams. The parietal and visceral layers of the pleura on the right side of the chest present a few slight adhesions; on the left they are everywhere strongly adherent. The right lung is enlarged, and on section presents the condition of vesicular emphysema. The lower lobe also shows a marked degree of hypostatic congestion. Weight, 1,280 grams. On section of the left lung a cavity 5 cm. in diameter is seen occupying a position in the apex. The entire upper lobe is infiltrated with tubercles. The lower lobe presents the conditions of vesicular emphysema and hypostatic congestion. Weight, 830 grams. The peritoneal cavity is normal. The spleen is normal; weight, 230 grams. On section the right kidney presents the condition of fatty degeneration. The cortex is thicker than normal, and both it and the pyramids are yellow in color. Weight, 270 grams. The left kidney presents the same pathological condition as the right; weight, 230 grams. The genito-urinary tract is otherwise normal. The liver is normal; weight, 2,150 grams. The digestive tract is normal. The spinal cord was not examined.

S. W.
W. M. J.
J. M. G.

CASE 33.

Stricture of urethra, organic—Inflammation of bladder, acute—Disseminated suppurative nephritis—Inflammation of large intestine—Tubercle of lung, double.

P. McD.; aged 26; nativity, Nova Scotia; admitted to United States Marine Hospital, port of Boston, Mass., September 10, 1897; died October 23, 1897.

History.—Patient contracted gonorrhœa two years ago, which lasted as gleet to the present time. Three months ago testicles began to swell. Was treated at

office for stricture of urethra and retention of urine before he was sent to hospital. On entering he was found to have a stricture just within the meatus urinarius and several deeper ones. Passes very small stream of urine with difficulty. Can not retain urine over one hour. No. 12 sound passed. This was followed by a chill. Later, at every attempt to pass sound, a chill followed, with bloody micturation; and after several days bloody mucous diarrhœa set in, which in spite of treatment, persisted with ten to fifteen stools a day until death. During entire sickness complained of difficulty in passing water, pain in back, and later of dyspnœa. Examination of chest at first was negative. Later revealed dullness at both apices with fine subcrepitant râles over entire front of chest. Heart sounds very faint, but regular.

Necropsy (twenty hours after death).—Poorly nourished; rigor mortis slight. Pericardium adherent to chest wall in front. Pericardium and entire anterior mediastinum emphysematous; contained 30 c. c. fluid. Heart wall pale and flabby, otherwise normal; all valves competent and normal except tricuspid, which was slightly enlarged. Left lung weighed 300 grams; was slightly adherent at apex. Upper lobe thickly studded with nodules in state of caseation. Lower lobe markedly congested. Right lung weighed 400 grams; adherent at apex; nodules in state of caseation in all three lobes with marked congestion in lower. Liver weighed 1,460 grams; was congested, friable, and of slightly "nutmeg" appearance. Gall bladder contained 20 c. c. of bile; no stones. Stomach contained 110 c. c. of green chyme. Rugæ were well marked. All the glands of the mesentery were enlarged, the largest being the size of a pea and in a state of caseation. Small intestine normal. Large intestine congested and showed elevated nodules on inner surface size of very small pea, possibly tubercles. Kidney: Left weighed 150 grams, congested, dark red, soft, bled freely, pelvis dilated; contained urine and pus; lower part contained large cysts in state of caseation; cortex well marked; capsule not adherent. Right weighed 155 grams; entire pelvis and most of cortex made up of cysts containing pus and detritus; rest of substance studded with smaller cysts in state of caseation. Suprarenal capsules weighed—left, 7 grams; right, 8 grams. Bladder contained 60 c. c. of cloudy urine; was contracted and congested. Urethra: Stricture near meatus and whole caliber of canal much contracted; marked congestion in bulbous portion. Epididymis enlarged and hard. Spleen normal; weighed 150 grams. Brain weighed 1,780 grams and contained small amount of fluid in membranes and ventricles.

S. B. G.

H. W. W.

CASE 34.

J. D.; male; aged, 33 years; nativity, Ireland; was admitted to the United States Marine Hospital, Port Townsend, Wash., March 7, 1898; died May 24, 1898.

History.—The patient was first admitted to the hospital on January 17, 1898, and remained under treatment for tubercle of the lungs until March 5, 1898, when, after violating the rules of the hospital, he remained away without permission. He reported two days later, and, apologizing for his desertion, he was readmitted on account of his serious condition. He stated that he had suffered with a slight cough for the past two and one-half years, which, gradually becoming more pronounced, had been quite severe during the past fifteen months. Shortness of breath had existed for nine months. He had had no night sweats, but the cough was very troublesome, and he expectorated profusely, but no blood at any time. He had lost considerable flesh and was growing much weaker. Upon admission he was suffering from a slight elevation of temperature in the evenings, but had no night sweats: the cough was very severe and large quantities of muco-purulent sputum were expectorated; the pulse was rapid and feeble. An examination showed diminished expansion of both lungs, an increase of vocal fremitus over

the upper portion of the chest on both sides, dullness over the upper lobes of both lungs, harsh respiratory murmur in the same locality, and numerous small mucons râles over both the upper and lower lobes of both lungs. The physical signs were sufficient to reveal beyond doubt that the disease was tubercular, but additional evidence was furnished by an examination of the sputum, which showed the presence of great numbers of tubercle bacilli. The course of the disease, after coming to the hospital, was acute, the patient becoming gradually weaker and much emaciated, but at no time having the slightest hemorrhage from the lungs. Creosote was tried in full doses, but was of no benefit. A profuse diarrhea supervened toward the end of the illness, and from this time the patient rapidly lost strength. His death occurred ten days later.

Necropsy (twenty hours after death).—External appearances: Body much emaciated; post-mortem lividity slight, and post-mortem rigidity not marked. Thoracic cavity: The pericardium was normal, containing 40 c. c. pale straw-colored serum. The heart muscle was healthy and the valves competent and free from disease, the organ weighing 378 grams. A small ante-mortem clot was found extending from the left ventricle into the aorta. Both pleural cavities were practically obliterated by numerous adhesions between the visceral and parietal layers of the pleuræ. Both lungs showed marked tubercular infiltration throughout their entire structure, but the process was not pronounced in the upper lobes. The right lung weighed 1,021 grams and contained in its apex a cavity 3 cm. wide and 5 cm. long, and many other smaller cavities scattered through its substance. The left lung weighed 832 grams and contained several small cavities in the upper lobe. The larynx presented no evidences of the disease; in fact, there was no inflammation or ulceration of its mucous membrane, but just posterior to the cricoid cartilage and extending behind the trachea as low as the fifth ring was a small cavity containing 7 c. c. of very thick white fluid. A smear from the contents showed a vast number of tubercle bacilli and a few staphylococci. The mucous membrane of the trachea and the bronchial tubes was congested and inflamed. Abdominal cavity: The peritoneum showed no evidences of tubercle and was healthy. The liver had undergone fatty degeneration and was somewhat enlarged, weighing 1,700 grams. The pancreas and spleen were normal; the weight of the former was 57 grams, that of the latter organ 155 grams. The mucous coat of the stomach presented no pathological changes and the greater portion of the small intestine was healthy, but there were a few small tubercular ulcers and some congestion in the lower part of the ileum. The kidneys were enlarged and slightly waxy; the left weighed 297 grams and the right 269 grams. The other portions of the genito-urinary tract were normal.

J. C. P.

LEPROSY—TUBERCULAR.

L. A.: aged 25 years; nativity, Hawaii; was admitted to the United States Marine Hospital, port of San Francisco, Cal., November 28, 1893, and died January 26, 1898.

History.—The patient had been ill five months when he applied for admittance. Illness began as a swelling of the foot, accompanied by pain in the knee. At this time the limb began to atrophy. Two months later paralysis developed in the affected limb. Physical examination showed that the patellar reflexes were normal; ankle clonus was not impaired, and an eruption was seen upon the back and arms. In December, 1893, anesthetic areas were mapped out over the feet and the titial sides of the legs. Upon mixed treatment the patient improved and was discharged January 14, but was readmitted on January 20, 1894. On January 24, 1894, examination showed the left forearm to be swollen slightly, the feet were swollen, tense, and shining. Pain was present in the knees and along the course of the sciatic nerves. Ten days later a deep-seated nodule appeared over the

sternocleido-mastoid muscle just below the lobule of the ear. During March brownish blotches developed on the back and a small lump was seen situated just anterior to the internal condyle of the right humerus. In June the blood was examined and large numbers of the lepra bacilli were found. Tubercles developed in one place, disappeared, only to reappear in another. This condition continued until June 30, 1897, when he was unable to leave his bed. At this time tubercles developed in the eyes, the one in the right eye ulcerated and filled the anterior chamber with pus. Paracentesis of the anterior chamber was performed to evacuate the pus, lessen the tension and relieve the pain. Shortly tubercles developed on the face and ears: many ulcerated and discharged pus which had a disagreeable and characteristic odor. Emaciation became very pronounced, the patient growing weaker until January 1, 1898, when he could with difficulty be urged to take food, and died of inanition at 4 a. m. January 26, 1898.

Necropsy (eleven hours after death). The body is that of a poorly nourished and greatly emaciated adult, mulatto male. Rigor mortis is well marked. The face is covered with tubercles, unhealed ulcers, and cicatrices; while the ears are masses of ulcerated tubercles. The skin of the neck, trunk, arms, and thighs is normal, but that portion covering the legs is cracked and scaly. The feet are swollen, the toes covered with ulcers, and the nail of the great toe of the right foot is missing. The fingers are greatly swollen, and over the left metacarpo-phalangeal articulation of the middle finger is a large ulcer. The right eye shows obliteration of the anterior chamber, while the left presents a staphyloma of the cornea which causes a bulging of the upper lid. Encephalon is normal. Weight of brain, 1,330 grams. The pericardium is normal. Heart normal; weight, 255 grams. A few adhesions are present at the apex of the left lung, otherwise the parietal and visceral layers of both pleurae are normal. The apex of the left lung is infiltrated with tubercles; the remainder of the lung is normal. Weight, 245 grams. The right lung is normal; weight, 265 grams. The peritoneal cavity is normal. Spleen is normal; weight, 310 grams. Kidneys normal; weight, right, 210 grams; left, 235 grams. The remainder of the genito-urinary tract is normal. The liver is normal; weight, 1,960 grams. The gall bladder was greatly distended with fluid and inspissated bile. The remainder of the gastrointestinal organs are normal. The spinal cord was not examined. All the organs show a large amount of pigment.

R. R. H.

H. S. M.

J. M. G.

SCLEROSIS LATERAL AND POSTERIOR COLUMNS SPINAL CORD.

C. B.; aged 43 years; nativity, Germany; was admitted to the United States Marine Hospital, port of San Francisco, Cal., May 17, 1895, and died November 14, 1897, at 2 a. m.

History.—On entrance the patient complained of weakness in his lower extremities, more marked in the left. He also said that he felt unsteady when walking in the dark or with the eyes shut. He gave a specific history of two years standing. Physical examination showed no atrophy of the lower extremities nor any arias of anaesthesia or hyperaesthesia. The reflexes were markedly exaggerated. The pupils were normal. He was given specific treatment for six months without benefit. He gradually grew worse, the paresis of the lower extremities becoming more pronounced and complicated with a spastic condition. During the last year he became bedridden; had involuntary movements of the bowels; incontinence of urine, and an occasional epileptic seizure. He gradually grew weaker until his death.

Necropsy (nine hours after death).—The body is that of a well developed, well nourished adult white male. Rigor mortis is well marked. There are areas

of superficial sloughing on the outer sides of both hips, and on the inner sides of both knees and ankles. They vary from 4 to 6.5 cm. in diameter. The skullcap, brain case, sinuses, and vessels are normal. There is a chronic meningitis present, especially well marked along the median sulcus. The brain is normal. The pericardium is normal. The heart is dilated; weight, 370 grams. The walls of the ventricular cavity are thinned and the cavity is dilated. The pleurae and lungs are normal. The omentum is normal. The spleen is normal. The kidneys present on section the condition of a chronic diffuse nephritis. They weigh 165 grams each. The genito-urinary tract is otherwise normal. The digestive tract is normal. The spinal cord presents no gross lesions.

S. W.

H. S. M.

J. M. G.

INFLAMMATION BRAIN MEMBRANES DIFFUSE, ACUTE SEPTIC.

C. J.; aged 32 years; nativity, Norway; was admitted to the United States Marine Hospital, port of San Francisco, Cal., November 27, 1897, and died December 2, 1897, at 2.45 p. m.

History.—On entrance the patient, who was slightly delirious, gave an indefinite history of headache, weakness, and fever for the preceding week. Physical examination: No evidence of any lesions of the viscera were discovered. His face was flushed, tongue coated, and his breath foul. The abdomen was distended with gas, and there was some rigidity on pressure. The pulse was full and ran 80 per minute. The temperature taken in the axilla was 39 c. There was no facial or local paralysis. During his first night in the hospital he became violently delirious, at times requiring restraint, and at other times he lay in a stupor. A second physical examination made on the third day after his entrance revealed a slight facial paralysis of the right side, some inequality of the pupils, and a thickness of speech. There was also some rigidity of the muscles of the neck and a rise in the surface temperature at the base of the skull. In spite of treatment his temperature remained high, and he steadily grew worse until his death.

Necropsy (twenty-one hours after death).—The body is that of a well developed, well nourished adult white male. Rigor mortis is well marked. The subcutaneous fat is abundant. The skullcap and brain case are normal, presenting no evidence of injury. The sinuses and vessels are normal. The pia mater over the convexity of the brain is injected, and along the larger blood vessels is thickened. The pia at the base of the brain and over the medulla and pons is thickened, injected, and covered with thick creamy pus. The tentorium cerebelli is also bathed in pus. The basal ganglia of the brain are normal with the exception of the pituitary body, which is the seat of an acute suppurative inflammation. The ventricles of the brain are distended with clear fluid. The brain is otherwise normal. The parietal and visceral layers of the pleura on both sides of the chest are everywhere adherent. The lungs present the condition of hypostatic congestion; the right lung weighs 720 grams and the left 750 grams. The pericardium and heart are normal; the heart weighs 350 grams. The omental fat is abnormally developed. The spleen is congested, but is otherwise normal; it weighs 150 grams. The kidneys are normal; the right weighs 170 and the left 190 grams. The genito-urinary tract is normal. The liver is normal; it weighs 1,970 grams. The digestive tract is normal. The spinal cord was not examined.

S. W.

J. M. G.

DEGENERATION CYST OF CEREBELLUM.

D. S.; aged 45 years; nativity, Massachusetts; admitted to United States Marine-Hospital, Cleveland, Ohio, October 6, 1897; died January 14, 1898.

History.—Mother dead from heart disease; one brother and one sister dead from tubercle of the lungs. Patient had syphilis eight years ago and pneumonia five years ago. Present trouble dates from March, 1897, when he began to suffer from severe pains in the head, occipital region. The pains are most severe in the morning and during exertion. He has alternating constipation and diarrhea, his gait is cerebellar (walks with the feet wide apart) and balances himself with difficulty. The cervical, epitrochlear, inguinal, and femoral lymph glands are enlarged; there is a small umbilical hernia, and circulatory and respiratory systems show nothing abnormal. Owing to the history, the case was considered one of cerebellar tumor, probably syphilitic in its nature and the usual specific treatment was adopted with anodynes for the relief of pain. Slight improvement was noted, but he complained much of his head and at times he became so noisy that he was restrained with difficulty. On November 15 he was much better, and the improvement continued until December 14, when he relapsed. His gait is now markedly cerebellar, stands with his feet wide apart, and if he attempts to walk with his eyes closed he pitches forward. The attacks of severe pain are frequently preceded by a kind of epileptic fit, and if he is about the ward he has to be carried to his bed. He has had a number of epileptiform convulsions recently in which he becomes very rigid, and these are followed by profuse perspiration and total unconsciousness of what has occurred during the seizure.

January 10, 1898.—Condition worse for the past few days, great pain in the head, and attacks more frequent. He attempted to throw himself out of the window last night, but remembers nothing of it this morning. Operative measures were considered in this case but abandoned, as it was considered impracticable to reach the seat of the trouble.

January 14, 1898.—During the morning ward visit at 9 a. m. he seemed quite rational, free from pain, and stated that he felt much better. At 10 a. m. while the medical officers were engaged in the surgical dressing room a sudden call came from his ward and on hastening there he was found dead in bed. He died without a struggle.

Necropsy (three hours after death).—Body fairly nourished; rigor mortis absent; post-mortem lividity on dependent portions of body. Head: Scalp and aponeurosis normal. Calvarium of moderate thickness; parietal eminence on left side very prominent. Slight adhesions over dura on right superior region, superior longitudinal sinus. Pia mater shows venous engorgement over cerebral hemispheres. Brain of average size and lateral ventricles contain considerable serum, choroid plexus on right side enlarged. Cerebral hemispheres and nuclei on cross and lateral section show no deposits of any kind and no softening. Fourth ventricle distended and marked by irregularities in the floor. Calamus scriptorius enlarged and bands stand out in bold relief. Other points of the floor marked by nodules and there is slight softening. The superior surface of the cerebellum was occupied by a cystic tumor which had produced by pressure absorption of the greater part of the superior vermiform process and upper surfaces of both lateral lobes. This tumor pressed directly on the pons and medulla, and was as large as a goose egg. The contents were gelatinous. Spinal cord not examined. Chest: Pleural adhesions on both sides; no effusions; leucomatous patches on visceral layer of pericardium; normal amount of pericardial fluid present. Heart in systole, valves normal, except slight thickening on margins of tricuspid. Slight atheroma in wall of ascending aorta. Lungs crepitant, carbon deposits present, and a puckered cicatrix in each apex. A

cretaceous particle the size of a small pea was found in the outer margin of the upper lobe of the right lung. Liver, large; pancreas, normal; spleen enlarged and somewhat softened. Small cyst on outer surface of right kidney, and both have considerable fat in the pelves. Stomach and intestine normal. Bladder distended with urine; walls thin. Microscopic examination of sections of the different tissues shows only slight catarrhal nephritis.

D. A. C.

CEREBRAL HEMORRHAGE.

P. R.; aged 42 years; nativity, Louisiana; admitted to United States Marine Hospital, Louisville, Ky., July 19, 1897, case being transferred from Chattanooga, Tenn.

History.—Six weeks prior to admission to hospital patient suffered a stroke of paralysis affecting left side. The center of speech was also affected to such an extent as to produce ataxic aphasia later in his sickness. Amnesic aphasia partially developed. The case developed no special points of interest, the cerebral hemorrhage being followed by softening, and as this progressed the physical and mental condition became worse; still the man retained considerable intelligence and a reasonable amount of physical ability, up to time of death, notwithstanding the large area of cerebral softening present as shown at necropsy.

Necropsy (fourteen hours after death).—Body of greatly emaciated colored male about 45 years old. Rigor mortis slight, neck quite movable, mouth wide open, eyelids partially closed, front teeth missing. No discharge from nose or mouth. Thorax flat, abdomen retracted. No cicatrices. Scalp divided by incision across from one ear to the other. There are no extravasations of blood or other signs of injury to head present. Skull cap very thick and difficult to remove, bones of skull about 8 mm. thick. The dura mater is everywhere thick and opaque. The vessels of the pia mater, choroid plexus, and the large vessels of the walls of the ventricles were calcified and atheromatous, and although empty they retained their shape, not collapsing at all. The corpus striatum and optic thalamus pale and soft. The white substance of the hemispheres is pale and moist; the ventricles empty. Considerable area of softened, broken-down tissue was found in both the pons and medulla oblongata. Thorax: Left lung adherent, pleural cavity contained about 400 c. c. fluid. Right lung free and very little fluid in cavity. Both lungs were cedematous with some small areas of hypostatic pneumonia in posterior inferior parts. Heart very considerably hypertrophied, about 30 c. c. blood in right auricle, somewhat smaller amount in left. Small ante-mortem clot extending into right ventricle. Aorta narrow, its inner coat hardened and atheromatous. Aortic and mitral valves incompetent; other valves competent. The spleen firm and somewhat wrinkled, at inferior border a cicatrix such as is at times left by a large hemorrhagic infarct was found. Liver of chocolate brown color, tissue on section of bronze color, substance firm. Both kidneys were hard and granular; the left contained an abscess about the size of a hazelnut. The omentum and intestines were normal in appearance, except post-mortem discoloration. Urinary bladder contained about 50 c. c. urine. Weight of organs: Heart, 540 grams; brain, 1,450 grams; liver, 1,170 grams; left lung, 440 grams; right lung, 770 grams; left kidney, 100 grams; right kidney, 110 grams; spleen, 75 grams. The radial and other arteries examined were not atheromatous except as noted. The amount of softening and breaking down of brain tissue about the centers of life were out of all proportion to the clinical phenomena, and in fact would seem to have been incompatible with continued existence.

W. P. McL.

EPILEPSY MAJOR.

A. I.; aged 24 years; nativity, Norway; admitted to the United States Marine Hospital, Stapleton, N. Y., December 27, 1897; died December 29, 1897.

History.—A strong, well-developed white man, with light brown hair and mustache, gray eyes, and yellowish skin. Height, 165 cm.; weight, 73 kilos. Patient was brought to the hospital in the ambulance, and was irrational, able to walk with an unsteady gait, and to comprehend a command sharply given, but no information could be elicited from him. Fellow-seamen stated that he had had a similar attack of "fits" twelve days before, lasting two days, after which he was perfectly rational. He lost consciousness at the onset. He was suddenly taken with a "fit" the night before admission, frothed at the mouth, was unconscious, and fell, and continued to have these attacks at intervals of twenty minutes to two hours, and has not been rational since. A few minutes after admission the patient's eyes had a wild, fixed look, the pupils contracted, the eyes moved as in lateral nystagmus, the left corner of the mouth twitched, and a condition of *grand mal* supervened. The patient vomited frequently and passed urine and feces involuntarily. The small amount of urine obtained showed a small relative quantity of albumen, but no casts of any character. Morphia and nitro-glycerin hypodermatically and chloral per rectum were given. Nutrient enemata were used, and efforts made to give food and medicine by the mouth or nose, but the convulsions continued at varying but frequent intervals until the patient's death, December 29, 1897. For some hours before death liquid râles could be heard over the lungs.

Necropsy (twenty hours after death).—Body that of a large, well-developed white man, with blue eyes, light-brown hair, and mustache. Height, 165 cm. Weight, 73 kilos. Rigidity marked. Lividity moderate. Pupils contracted. No marks of violence or traumatism found, either recent or old. Calvarium removed, the bones being uniformly thin and compact. Sinuses contained some very dark blood. Brain weighed 1,325 grams and seemed normal, save a softened area about the temporo-parietal lobe of cerebrum (probably post-mortem). Puncta well marked. Vessels of cortex large and injected; no adhesions; ventricles well filled with fluid. Pons varoli and cerebellum normal, as was the medulla. Thorax opened and nothing abnormal noticed in the anterior mediastinum. The pericardium contained about 15 c. c. of straw-colored fluid; the heart weighed 340 grams, and both valves and walls were intact. Lungs: From both, upon section, exuded a sanious frothy fluid; the tissue was red in color and felt somewhat gelatinous. Sections of each lung and the lungs as a whole did not sink in water. Pleural surfaces normal. Abdomen contained some little loose fluid. The stomach was nearly empty and nothing abnormal was detected. The intestines were inflated with gas. The liver weighed 1,500 grams and the gall bladder contained 10 or 15 c. c. of brown fluid. The right kidney weighed 340, the left one 150 grams, and both were congested. The left kidney was about 15 cm. long and curiously shaped. The spleen weighed 180 grams. The bladder was nearly empty. A careful necropsy revealed no pathological condition which would account for the death and symptoms preceding it.

H. S. C.

G. W. S.

TRAUMATIC ABSCESS OF LIVER—RUPTURE INTO PERICARDIUM.

P. B. (colored); aged 26 years; nativity, Virginia; admitted to United States Marine Hospital, Louisville, Ky., March 14, 1898; died June 30, 1898.

History.—Patient states that he has been sick for six weeks. Complains of some pain in bowels and diarrhea, stools being slightly tinged with blood. On March 8, 1898, one week before admission to the hospital, while handling a

sack of potatoes weighing about 200 pounds it fell a distance of four feet, striking him on the chest and over the stomach. He complains of some pain in chest, especially aggravated by pressure on ensiform cartilage of sternum, although there is no evidence of fracture. The stools passed by patient since admission do not contain blood. There was very decided shock: temperature subnormal; pulse 100 and weak. It is worthy of note that during subsequent illness and for whole time the man lived, his pulse was never less than 90 per minute and ranged most of the time from 120 to 130. This tachycardia persisted notwithstanding the use of heart sedatives and stimulants and in spite of the fact that for a considerable part of the time the patient's temperature was nearly normal, his appetite good, and no heart murmur could be detected. The condition was correctly attributed to strong pericardial adhesions. The apex beat was 3 inches out of normal line, being displaced upward and backward toward axilla. The liver dullness was extreme, indicating severe congestion of this organ. There was some dullness over left kidney: urine contained albumen but no casts. About two months after admission (June 12) the patient, who had never been entirely free from fever for any length of time, began to have high fever at night, also slight rigors, indicating pus formation: liver abscess suspected, but the other symptoms led to diagnosis of suppurative pericarditis. Shortly after this a marked dullness, with elimination of intercostal spaces, was found to exist on the right side of chest. Aspirations followed by resection of two ribs, sixth and seventh, and the evacuation of large quantities—5,000 c. c.—of pus was the next step. This pus contained shreds of liver tissue and was grayish brown in color. Numerous bacteria, of which the staphylococcus pyogenes aureus was one, were found.

Necropsy (fourteen hours after death)—Body of colored male, much emaciated. Post-mortem lividity slight. Rigor mortis present. No cicatrices. Froth on lips and nostrils. Wound in anterior chest wall, right side, near axillary line, about the size of a hen's egg. This wound connected with left pleural cavity. The skullcap is thin and moderately arched. Dura mater strongly adherent. The pia mater is greatly congested, the vessels full and tumid, exudate of lymph on apex of brain. Lateral ventricles contained slight quantity of fluid. No injury to brain. Weight of brain 1.260 grams. Thorax: Upon removal of sternum the left lung comes prominently into view, the right lung being compressed to about one-fourth its normal size. On the left side the adhesions are very firm between the heart, pericardium, diaphragm, and liver; the pericardium also is adherent to sternum and is cut through in removing that bone. On the right side the pleural cavity is lined with thick grayish-white pyogenic membrane and converted into a pus cavity. A fistulous track as large as a man's finger is found to pass from anterior part of right pleural cavity along the upper and anterior surface of diaphragm into pericardium, and thence through diaphragm into an abscess cavity in left lobe of liver. The pericardium was strongly adherent to heart in an attempt to cut off and limit pus cavity. A distinct abscess cavity the size of a goose egg is in pericardium. The liver abscess is about the size of a large navel orange. The adhesions are so strong between heart, diaphragm, and liver that it is found impossible to remove one without the other. The valves of the heart are found to be pale and flabby; the mitral and pulmonary contain recent vegetations. The heart muscle is somewhat atrophied and is so strongly bound down by adhesions that it is surprising that it could pulsate at all. The color of liver is grayish brown. The gall bladder is empty. The liver and heart together weighed 1,440 grams. The left lung apparently healthy, weight 310 grams. Right lung contracted and congested, weight 360 grams. Both kidneys were pale and mottled, like mottled castile soap. The organs were both contracted and hard; line of demarcation between cortical and medullary substance was very ill defined. The capsule was torn in peeling, being strongly adherent to kidney. Weights: Left, 100 grams; right 90 grams. There is nothing remarkable about the spleen

except its shape, which is that of the horseshoe crab, with the tail somewhat broader and longer. Weight of spleen 200 grams. Pancreas weighed 100 grams. The peritoneum is considerably congested and of bluish-black color, the latter being a post-mortem change. The mucous membrane of stomach is tinged throughout with blood, but no lesion found, only large veins distended with blood. There are two points worthy of notice in this case: (1) The traumatic origin of the liver abscess, which is exceedingly rare; (2) the rupture of abscess into pericardium, an accident of rare occurrence and almost invariably fatal at once; still this man lived at least three weeks after this occurrence, as the pus burrowed into right pleural cavity from which it was evacuated, there being not less than 5,000 c.c. in quantity removed, the man living eight days after operation and dying of exhaustion.

W. P. McI.

INFLAMMATION MIDDLE EAR—SUPPURATIVE—PACHYMEMINGITIS.

J. M. D.; aged 33 years; nativity, Missouri; was admitted to the United States Marine Hospital, port of San Francisco, Cal., March 23, and died May 22, 1898.

History.—Patient came to the hospital to be treated for a sprained ankle, but on the eighth day after he was admitted he complained of a severe pain in the right ear. This pain persisted and was accompanied by a rise of temperature. It was met by quinine in full doses and greatly relieved. On April 6 there was a bloody discharge from the nose. On April 7, after the application of heat to the ear, the roof of the external auditory meatus, external to the drum, perforated and pus was discharged. The ear was flushed daily with peroxide of hydrogen; the middle ear inflated according to Politzer's method, and sulphate of morphine applied locally; a douche of warm boric acid solution, continued for twenty minutes at a time, frequently used with apparent improvement. There were still occasional exacerbations of the facial neuralgia. Strabismus (internal) of the right eye developed with a slight ptosis. A well-defined suspicion of syphilis existing, this treatment was supplemented by moderate doses of bichloride of mercury, and the patient was prepared for operation, it being determined to perforate the mastoid on May 9. On that day, however, the symptoms had ameliorated so markedly that the operation was postponed as not immediately indicated, and the patient spent much time in the open air. On the 17th the temperature rose suddenly, and on the next day the patient was operated upon under strict antiseptis, the mastoid process freely opened, and the middle ear reached by perforation parallel with and immediately behind the meatus. Much diseased bone was detached or cut away and a free issue made. The patient did not rally promptly from the operation but remained more or less in stupor. His temperature continued to rise, reaching 41.2° C. on the evening of May 21. Patient died at 10.30 a. m., May 22, 1898.

Necropsy (five hours after death).—The body is that of a well-developed, fairly well nourished adult, white, male. The pupils are slightly dilated; rigor mortis is well marked. The skullcap and brain case are normal. In the knee of the lateral sinus is a clot 2½ cm. long. The whole of the convex surface of the cerebrum, especially in the right temporal region, is covered with pus. The vessels of pia mater are very much congested. The cerebellum is bathed in pus, while the cerebro-spinal fluid is increased; weight of brain, 1,650 grams. The pericardium is normal; the heart muscle is infiltrated with fat; valves normal; weight, 355 grams. The parietal and visceral layers of both pleurae are normal. Upon section, the lower lobes of both lungs are seen to be hypostatically congested; weight of right lung, 510 grams; left, 350 grams. The peritoneal cavity is normal; spleen very much congested; weight, 335 grams. Both kidneys are congested; weight of right, 190 grams; left, 175 grams. The rest of the genito-

urinary organs are normal. The liver upon section is seen to be congested. Over the convex surface are seen a number of triangular areas, pinkish in color, having the appearance of an infarction at an early stage; weight of liver, 1.965 grams. The remainder of the gastro-intestinal tract was normal. Spinal cord was not examined. A section of the temporal bone through the mastoid process showed the mastoid cells to be filled with a very thick pus, while the tympanum contained pus mixed with blood. The drum was detached in the anterior and superior quadrant.

R. R. H.

J. M. G.

ABSCESS OF KIDNEY—DISSEMINATED SUPPURATIVE NEPHRITIS— URINARY ABSCESS.

C. S. C., aged 65; nativity, Massachusetts; admitted to United States Marine Hospital, Stapleton, N. Y., August 12, 1895; died October 10, 1897.

History.—About fifteen years ago went to Roosevelt Hospital for retention of urine, and says they made a perineal incision and found a tumor in the perineum which was removed. Wound closed well, but later opened again. About six years ago he began to pass his urine involuntarily, and this has now grown much worse. He can not hold his urine more than ten or fifteen minutes. Bowels regular; poor appetite; sleeps poorly. Urinalysis shows a trace of albumen; was acid, of low specific gravity, and passed in quantity. Has a fistulous opening in his perineum through which urine sometimes passes; also found to have several organic strictures of urethra, mainly in deep urethra. His treatment consisted of internal administration of alkalies, with the passage of urethral sounds and irrigation of bladder. His frequent miction continued, however, and the fistula in perineum refused to close, although it became much better. His urine was examined from time to time and showed a constant increase in amount of albumen, and finally the presence of pus cells; no casts were found at any time. In irrigating his bladder its capacity was found to be only about 100 c. c. For the last two or three months of his life he was always drowsy and sleepy, with a dry, harsh skin, and often slight œdema of legs. On October 1, 1897, he noticed a swelling in his scrotum about the size of a hen's egg; no pain except when urinating. This mass lay just between the testicles, was quite hard, but a little painful on pressure, and was attached to about center of perineum. There also seemed to be some swelling and tenderness of right spermatic cord. He began to run some fever and became quite stupid and dull. His bowels were moved freely and he was put on stimulating and nourishing treatment. On October 3 an incision was made through the scrotum into this tumor mass, and considerable quantity of pus evacuated. The cavity was cleaned and packed. His stimulation was increased. He felt much more comfortable after evacuation of pus, and the temperature came down to normal. In spite of this, however, he did not rally; he began to vomit, his tongue became brown, dry, and cracked. His pulse gradually failed and he became more stupid and dull, passed his urine and feces involuntarily, and died 2 a. m., October 10, 1897.

Necropsy (nine hours after death).—Body of a white man, gray hair and beard, fairly well developed and nourished, 5 feet 8 inches high, weight 160 pounds. Some pitting of legs; section showed tissues infiltrated with fluid. Calvarium removed, skullcap thick, with little diplœ. Dura mater appeared somewhat cloudy and its vessels were engorged. On removing dura some fluid (clear amber in color) flowed away. Over the vertex the meshes of the pia mater contained considerable fluid and the whole surface of the cerebrum appeared dark and congested. On section the ventricles were found distended with fluid, and in the white matter of posterior portion of frontal lobe appeared a brownish pigmented

spot which teased apart with difficulty. Otherwise normal. Thorax: Mediastinal glands enlarged. Pericardium contained no fluid. Coronary arteries calcareous. Two or three whitish spots on outer surface of heart muscle. Left ventricle wall very thick, aortic valve leaflets thickened, rigid, and the valve incompetent. In a sort of ridge surrounding the orifice of the aorta, just above the aortic valve, were a number of little calcareous particles, many of which were easily broken off with the finger. A short distance above the valve the aorta contained in its substance two or three calcareous plates, each about 1 cm. square; the whole vessel being thickened and more or less rigid. The other valves were normal. Weight of heart, 500 grams. Some pleuritic adhesions. Lungs normal. Abdomen: Spleen friable and slightly enlarged. Kidneys: Left, about normal size, (weight 250 grams). Capsule stripped off with difficulty, leaving a rather rough granular surface behind, with occasional papular projections of kidney substance. On incision the organ was found almost destroyed; numerous abscesses were scattered throughout its substance and the kidney tissue between was hard, pale, and tough. Right, weight 200 grams. This was in about the same condition as the left, except that in several places the abscess cavities were filled with calcareous particles, and two or three of them were easily lifted out (the largest measured about 1 by 5 cm.). The ureters on both sides were greatly dilated: their walls were very thick and the mucous membrane was dark brownish gray, almost black in color; a good deal of pus was found in the right one. The bladder was empty; its walls greatly thickened, and its cavity about 100 c. c. in capacity. The mucous membrane was like that of ureters. No pus observed here and no abnormal opening could be found, though probably a small valve-like one existed which communicated with the small perineal fistula. The prostate was not enlarged, but in its substance and surrounding the urethra there was a small cavity whose walls were ragged and uneven. The pus sac in perineum was fairly clean, and no communication was found with the urethra.

C. H. L.

G. W. S.

ABSCESS, CONNECTIVE TISSUE, ANTERIOR MEDIASTINUM—CONGESTION OF LUNG, PASSIVE.

J. R.; aged 46 years; nativity, Portugal; was admitted to the United States Marine Hospital, port of San Francisco, Cal., February 17, 1898, and died February 19, 1898.

History.—On admission the patient gave an indefinite history of a three weeks' illness. He complained of hoarseness, dyspnea, night sweats, and loss of weight. Physical examination: The patient was a poorly developed, somewhat emaciated adult male. The chest was well shaped and the movements were normal. The lungs showed dullness on percussion over the left apex, and over the lower lobe of the left lung posteriorly, and on auscultation, moist râles were heard. The heart was normal; on the walls of the nasal passages were numerous small ulcers. The larynx was inflamed. In spite of vigorous stimulative treatment the patient grew rapidly weaker until his death.

Necropsy (ten hours after death).—The body is that of a poorly developed, somewhat emaciated, adult, white male. Rigor mortis is well marked. The encephalon is normal. Weight of brain, 1,340 grams. On opening the anterior mediastinum it is seen to be filled with thick, creamy pus. Exploration of the abscess cavity shows that the pus has burrowed upward beneath the sternomastoid muscles and the deep fascia, and lying in front of the anterior spinal muscles has surrounded the pharynx, œsophagus, and larynx. Careful examination fails to show any bare bone. The pericardium and heart are normal. Weight, 380 grams. The pleuræ are normal. The lungs are normal except for a passive

congestion of the lower lobes; weight, right, 700 grams, left, 750 grams. The spleen is normal; weight 120 grams. The kidneys are normal; weight, right, 160 grams, left, 180 grams. The genito-urinary and digestive tracts are normal. The liver is normal; weight, 2,150 grams. The spinal cord was not examined.

S. W.

W. M. J.

J. M. G.

GUNSHOT WOUND OF ABDOMEN.

E. J.; aged 26 years; nativity, Norway; admitted to the United States Marine Hospital, Key West, Fla., April 24, 1898; died April 25, 1898.

History.—Admitted to hospital 6.30 p. m. April 24, 1898. One of the prize crew of the Spanish steamship *Pedro*. Allowed his revolver to fall out of the holster, which being discharged, ball entered the body about 10 c. c. back of the great trochanter. The man was transferred to the U. S. S. *Helena*, under the care of the medical officer of the above-named vessel, and from there transferred to the marine hospital, arriving there about seven hours after the injury. On examination, a probe could be introduced a distance of 7 cm. in a direction upward and inward without coming in contact with the ball. After several attempts to introduce it farther, it was given up for the present. Considerable pain in the lower part of the abdomen was complained of, but there was slight tenderness only. The patient suffered from constant desire to make water. The introduction of a catheter showed nothing abnormal in the urine; 0.016 morphia sulph. was administered hypodermically, and repeated two hours later, the pain still continuing. At 10 p. m. the patient was semiconscious; pulse 130 and very feeble; temperature 38.5° C. Subcutaneous injections of ammonia and digitalis were given at 10 p. m. and 12 midnight. At the latter hour the pulse was scarcely perceptible. Death occurred at 2 a. m.

Necropsy (eight hours after death).—Rigor mortis well marked. Body that of a man about 26 years of age, well nourished. Ecchymosis generally diffused over the body, especially in dependent portions and about the neck. Abdomen tense and tympanitic. Gunshot wound on right buttock about 10 cm. back of the great trochanter. The opening is round, about 7 mm. in diameter; edges uneven, everted, and contused. A probe can be placed without difficulty for about 30 cm. in the direction of the superior spinous process of the ileum. No wound of exit is visible. On the removal of the dressing about 25 c. c. of dark blood issued from the wound. Thoracic cavity: Organs contained therein normal. Lungs and heart contained less blood than usual. Abdominal cavity: On opening abdominal cavity a large amount of gas escaped, partly relieving the abdominal tension before mentioned. The great omentum contains but little fat. On its left side rests an extensive blood clot. The large and small intestines are distended with gas, and the peritoneal covering injected. The transverse colon is black from an extensive ecchymosis. The cœcum is particularly injected. The abdominal cavity contained about 1,500 c. c. of blood. The ascending colon is perforated and filled with blood. The tissues of the gut for a considerable distance about the perforation are swollen and ecchymosed. The small intestine about the middle shows a perforation. The right psoas muscle, about 10 cm. above the brim of the pelvis, shows an oval opening about 2 cm. long by 1 cm. wide, leading into a channel extending downward, backward, and outward. About 7 cm. from the opening the iliac portion of the os innominatum is perforated. The hole is about 1 cm. in diameter, the edges jagged; numerous small pieces of bone fill the wound leading to the abdominal cavity. The ball was found lying loosely against the left side of the abdominal cavity. It was flattened, twisted, and jagged. All other organs normal.

G. M. G.

GUNSHOT WOUNDS.—HEAD, CHEST, AND NECK.

S. T. (colored): aged 31; nativity, Texas; admitted to United States Marine Hospital, New Orleans, La., March 21, 1898; died at 9 a. m. March 22, 1898.

History.—Patient was shot four times six days ago, one bullet striking the top of head, two entering the neck, and one grazing the arm, striking the right side of chest; at present suffers from severe shortness of breath and pain in chest. Examination shows small wound of scalp at about the junction of the coronal and sagittal sutures, no fracture of the skull; two small, round wounds of the neck, healed over, one about 3 cm. below the lobule of right ear, the other about 3 cm. above the inner extremity of the right clavicle; small, round wound in upper part of right axilla, and a grazed, superficial wound of right arm. Face paralyzed on right side; tongue paralyzed on left side; no change in the eyes; emphysema of upper part of chest, most marked on right side, where it extends upward into the neck and around the body to the back of chest; pulse 90, fairly strong; temperature 38° C. Expectoration very offensive, as is also the breath. Patient is obliged to lean forward over a chair on account of the severe dyspnoea, rendering an examination of chest difficult. Heart is pushed over to the right of the sternum, but nothing abnormal about the heart sounds could be heard; lungs congested, and filled with mucous râles; respiratory murmur harsh, and louder on right side than on left. Swallows with difficulty. Morphia, gram 0.015, was given hypodermatically and repeated during the night, along with strychnine, gram 0.002. Inhalations of steam impregnated with carbolic acid were given during the night. Death suddenly occurred at 9 a. m. the following morning.

Necropsy (three hours after death).—Subject, negro; weight, about 170 pounds; well formed; beginning rigor mortis, some warmth of abdomen and chest and upper part of thighs. Emphysema of right side of chest, right axilla, right side of back, right side of neck, right cheek, upper part of chest, and supraclavicular regions of left side. Pupils normal. Small, round wound of neck behind the ramus of lower jaw, 4 cm. below lobule of right ear; second wound, also round, covered by scab, 3 cm., above clavicle of right side, about 3 cm. external to mid line; third wound situated in upper part of right axilla, covered by scab; fourth wound, 1 by 3 cm., on inner surface of right arm; fifth, two small round wounds, one on either side of sagittal suture, just behind the coronal suture, both wounds covered by recent scabs. Small, hard body found under the skin at tip of shoulder, which proved to be an unencapsulated bullet, .38 caliber, surrounded by a few drops of purulent fluid. Superficial appearance of abdominal organs in situ, normal. Left pleural cavity contains 2,200 c. c. of dark-colored fluid of foul odor, bloody and purulent in character; the pleura, parietal and visceral, covered by greenish-black deposits of fibrin and coagula. Small opening at apex of pleural cavity; second, small, round opening through the pleura at the fifth rib, posteriorly, rib fractured and splintered: bullet, .38 caliber, found embedded in muscles of back, having been deflected upward and backward. Course of the bullet traced from apex of pleural cavity upward to root of neck on right side at place of entrance. Left lung weighs 639 grams, collapsed, much congested and partially consolidated; presents two small hemorrhagic areas, results of blood extravasation, one at the apex, the other slightly below and to the outer side of the apex, on the posterior surface. Right lung normal; weight, 685 grams. Right pleura normal. Examination of wound in upper part of right axilla shows that the bullet did not penetrate the right chest, but was deflected upward to lodge at tip of shoulder under the skin. Heart was pushed far over to the right side, fully 4 cm. to right of right edge of sternum, otherwise normal, as was also the pericardium; weight, 365 grams. Liver normal; weight, 2,725 grams. Spleen normal; weight, 312 grams. Right kidney normal; weight, 255 grams. Left kidney

normal; weight, 232 grams. Stomach, intestines, and gall bladder were normal. Bladder, prostate, and urethra normal. Examination of wounds of forehead showed them to be superficial and connected; no injury to the skull; wound of upper part of neck traced from external surface upward to mastoid process of temporal bone, which was splintered, and embedded therein was a badly shattered bullet.

H. H.

GUNSHOT WOUND OF LUMBAR REGION—INFLAMMATION MEMBRANES SPINAL CORD, DIFFUSE.

T. F.: aged 40 years; nativity, Ireland; was admitted to the United States Marine Hospital, port of San Francisco, Cal., October 25, 1896, and died February 16, 1898.

History.—Patient was shot in the back, bullet entering through the right ilium near its crest and 12 cm. from the mesial line, about six months before he entered the hospital. Examination showed the reflexes were normal. The wound of entrance was closing, so no attempt was made to locate the bullet. The wound was dressed daily, but nothing further was done until February 4, 1897, when an incision 5 cm. in length was made at the opening of the sinus on the right side. At this time the sinus was explored with a telephonic bullet probe, but with no success. Exploration of the sinus, however, showed the point of entrance was on the right side 9 cm. behind the anterior superior spine of the ilium and just at the crest. The sinus runs downwards, backwards, and inwards, apparently perforating the body of the fourth lumbar vertebra. Six centimeters from the opening of the sinus on the right side dead bone was found on the inner surface of the ilium, and 4 cm. beyond this point other dead bone was felt. The sinus was curetted and packed with gauze. The wound was dressed daily. The discharge of pus was considerable. On February 16 an incision was made over the posterior superior spine of the ilium on the left side over swelling, but with negative results. The wound was dressed daily until March 24, 1897, when another operation was performed. The sinus was curetted and an incision 5 cm. in length over the posterior inferior spine on the left side was made and 20 cc. of pus evacuated. Necrosed bone was removed from the bottom of the sinus. On April 5 the wound on the left side showed tendency to close. On April 16, 1897, it measured 5 cm. in depth. The original sinus to the right of the spine is 8 cm. in depth, and a probe passed strikes bare bone. From this time the condition remained the same until July 24, 1897, when the sinus was again explored to the bottom, enlarged throughout its whole extent and curetted. The wound over the posterior superior spine of the ilium (left) was enlarged and curetted. A movable projection over the lower part of the sacrum was cut down upon and a .44 caliber rifle bullet removed. The wounds were dressed daily, the condition improving, but the sinus never wholly closing. Once the wound on the left side closed, but only for a few days. On November 3, 1897, both orifices of the sinus were enlarged and the sinus itself curetted. The wound in the ilium was enlarged and a drainage tube passed into one wound and out of the other, the tube passing to the rear of and apparently near the spinal cord at about the level of the fifth lumbar vertebra. On November 13, 1897, the drainage tube was removed and a short tube at either end was introduced. The patient improved slightly. On February 10, 1898, the patient requested that another operation be performed. This was done February 14, 1898, when the sinus was laid open on the right side to the spinal column and the walls of the sinus through the column curetted. The same work was done on the left side. A drainage tube was passed through and the wound packed with gauze. Patient did poorly. On February 15 he was in a condition of coma; pulse was weak and rapid; respirations shallow, and the face cyanosed.

He was stimulated with whisky, strychnine and strophanthus, hypodermatically. His mind was clear at 9 a. m., February 16, 1898, but he gradually grew weaker, and died at 5.30 p. m. the same day.

Necropsy (sixteen hours after death).—The body is that of a well-developed though somewhat emaciated adult; white; male. Rigor mortis well marked. On the back the operation wound is seen. On the right side it begins at the outer edge of the quadratus lumborum muscle 2.5 cm. below the crest of the ilium, then passes transversely to a point 1.5 cm. from the spinous process of the fourth lumbar vertebra on the right side. On the left side the incision passed directly from the sinus upward, 2 cm. above the posterior superior spinous process of the ilium. Skullcap, brain case, and sinuses normal. The membranes of the pons and lower part of the cerebellum and medulla are covered with exudate. The fourth ventricle is filled with pus. The cerebellum is injected. Weight of brain, 1,342 grams. The pericardium is normal. Heart normal; weight, 385 grams. A few adhesions are present at the base of the left lung, otherwise the parietal and visceral layers of both pleuræ are normal. Lungs normal; weight of right, 490 grams; left, 350 grams. The peritoneal cavity is normal. Spleen is softer than normal; weight, 210 grams. Situated in the center of the medullary portion of the left kidney is a cyst 2 cm. in diameter; weight, 200 grams. Right kidney normal; weight, 245 grams. The rest of the genito-urinary organs is normal. The liver is pale and shows evidences of amyloid degeneration; weight, 1,710 grams. The gall bladder is distended with bile. The remainder of the gastrointestinal tract is normal. Examination of the sinus shows it to pass through the ilium, then beneath the spinous process, and finally through the lamina of the fourth lumbar vertebra, opening the canal and membranes of the cord; then passing through the ilium to the external sinus on the left side. Throughout the sinus small fragments of lead are seen, which are adherent to the wall. On careful dissection a minute perforation is found in the membranes of the cord. The cavity was filled with sero-sanguineous and purulent fluid.

R. R. H.
W. M. J.
J. M. G.

STRANGULATION OF THE INTESTINES.

F. J.: aged 30 years; nativity, Norway; admitted to the marine ward, St. Vincent's Hospital, Norfolk, Va., on June 7, and died June 9, 1898.

History.—This patient had been constipated for five or six days, and although cathartics had been administered, no movement from the bowels had taken place. On examination lungs, heart, and urine found to be in a normal condition. A small tumor about the size of a hen's egg was discovered in the right inguinal region. It was freely movable, not connected with the inguinal canal, and apparently located just above Poupart's ligament. There was no impulse on coughing, and the patient stated that the tumor had been there eleven years, and that at one time there was a similar tumor on the other side, which gradually disappeared. The tumor gave him no pain, and was neither painful nor tender to the touch. The abdomen was slightly enlarged, dull on percussion above the umbilicus, and slightly tympanitic over both iliac regions. No abdominal tumor could be detected. The patient stated that he had suffered within the last few days from cramp in his stomach. Obstruction of the bowels was diagnosed, and fecal impaction thought to be the cause. Salts were given by the mouth and a large enema administered. This was followed by a copious movement of the bowels and very free vomiting, the vomited matter having a fecal odor. The next morning the patient expressed himself as feeling perfectly well, and said that he would like to have a good meal. No tumor could be made out in the abdomen. He

continued to do well during the day and the fecal impaction was thought to have been removed. During the following night he became rapidly worse, with a quick, weak pulse and vomiting, and died in collapse.

Necropsy (twelve hours after death).—The body was that of a well-nourished white man. Heart and pericardium normal. Both lungs normal (slight anthracosis in both apices) and no adhesions in either pleural cavity. Liver normal. Gall bladder distended with bile, but contained no gall stones. Spleen, pancreas, and both kidneys normal. Bladder small and walls thickened. No evidence about penis or body of venereal disease. Brain normal. The tumor described in the above history was found to be an old omental femoral hernia. The sac was very much thickened and the omentum adherent, cutting off the abdominal cavity completely. The stomach and small intestines were distended with fluid matter and the intestines were slightly congested. The last 18 inches of the ileum and the large intestines were empty and collapsed. A small knuckle of the ileum was found caught in a fold of the omentum, leading to the femoral ring. This portion of the intestine was very much congested but not gangrenous. The intestine was not connected in any way with the hernia, but was constricted by a fold of the omentum about 2 inches from the femoral ring.

B. W. B.

DISEASES OF HEART.

CASE 1.

Valvular disease of heart—Aortic obstruction—Bright's disease—Hemorrhage into brain substance.

S. C.; aged 52 years; nativity, Jamaica; was admitted to the United States Marine Hospital, port of San Francisco, Cal., November 29, 1897, and died January 27, 1898, at 5 a. m.

History.—The patient gave a history of rheumatism of two years standing and of dyspepsia. He complained of shortness of breath, of pain in his stomach, and of nausea, most pronounced after eating. Physical examination: The chest was well shaped and its movements were normal. On percussion no dullness was discovered. On auscultation a few moist bronchial râles were heard over the upper lobes of both lungs. The cardiac area of dullness was enlarged downward and to the left. On auscultation an aortic systolic murmur was heard. The liver and spleen were not enlarged. The pupils were small and did not react either to light or accommodation. On standing with the heels together and the eyes shut he did not fall, but swayed to a marked degree. The patellar reflexes were present, but he was totally unable to walk a straight line, even with the eyes open. Under treatment his cardiac and gastric symptoms improved until January, 2, 1898, when he had a cerebral hemorrhage, causing him to lose consciousness for thirty or forty minutes. When he regained consciousness it was noted that he had a complete anesthesia of the right half of his body and that the right side was paralyzed. There were continual twitchings of the right hand and arm. The pupils were equal and no facial paresis was discovered. For a time the patient again improved, his mentality becoming clearer; but later an aphasia developed and he became weaker until his death.

Necropsy (six hours after death).—The body is that of a poorly developed, undersized, moderately emaciated, adult mulatto male. Rigor mortis is not well marked. The skullcap, brain case, and sinuses are normal. The arteries everywhere present a marked condition of atheroma. On section of the brain a recent blood clot, 2 cm. in diameter, is seen, occupying a space in the posterior third of the internal capsule, lying behind the lenticular nucleus, and its lower border lying on a plane situated 0.5 cm. above the floor of the posterior cornu of the left

lateral ventricle and extending in a vertical direction as high as the under surface of the corpus callosum; otherwise the brain is normal. Weight, 1,380 grams. The pericardium is normal. The heart is concentrically hypertrophied, the hypertrophy being mainly at the expense of the ventricular cavities, the left ventricular cavity being only one-third its normal size. The walls of the left ventricle are 2.5 cm. in thickness. The valves are normal, but there is an apparent stenosis of the aortic orifice. Weight, 340 grams. On the walls of the aorta are numerous atheromatous patches. The parietal and visceral layers of the pleura on the right side of the chest are everywhere adherent. The parietal and visceral layers of the pleura of the left side of the chest are adherent at the apex. On section the right lung is found to be normal except for a passive congestion of the lower lobe. Weight, 420 grams. On section of the left lung the upper two-thirds of the superior lobe show evidences of a partially healed tubercular process; the lung is otherwise normal except for a passive congestion of the inferior lobe. Weight, 620 grams. The peritoneal cavity is normal. The spleen is adherent to the surrounding tissues. On section the pulp is found to be soft and friable and presents the condition of a chronic interstitial splenitis. It is smaller than normal and weighs 70 grams. The right kidney presents on section a cyst 2 cm. in diameter, filled with clear fluid, occupying the cortex and lying on a level with the lower border of the pelvis. The capsule is slightly adherent and the tissue presents the condition of a chronic productive inflammation without exudation. Weight, 160 grams. On section of the left kidney a cyst 2.5 cm. in diameter, occupying the same relative position as the one in the right kidney, is present. The pathological condition present is similar to that of the right kidney. Weight, 150 grams. The genito-urinary tract is otherwise normal. On section of the liver a wedge-shaped hemorrhagic infarct, 6 cm. in diameter at the base, with the apex of the wedge pointing toward the hilum of the organ, is seen occupying a central position in the lower and posterior portion of the right lobe. The tissue contained within this area is soft and friable and granular. The liver is otherwise normal. Weight, 1,470 grams. The gall bladder is moderately distended and contains 75 c. c. of thick, dark bile. The gastro-intestinal tract is otherwise normal. The spinal cord was not examined.

S. W.

H. S. M.

J. M. G.

CASE 2.

Aortic insufficiency—Compensatory hypertrophy.

L. W.: aged 32 years; nativity, Cape de Verde Islands; admitted to the United States Marine Hospital, port of San Francisco, Cal., November 8, 1897, and died November 28, 1897, at 12.30 a. m.

History.—On admission the patient complained of shortness of breath, palpitation of heart, and of frequent shooting pains beginning in the region of the heart and radiating to the left shoulder and arm. Physical examination: On examination nothing abnormal was found in the various organs of the body, with the exception of the heart. The heart was enlarged downward and to the left. The apex beat was situated in the sixth intercostal space, 4 cm. to the left of the nipple. On auscultation a loud murmur was heard over the aortic valve, occurring both at systole and diastole. The other valves were normal. Under treatment the heart became steadier and the pulse somewhat better, but the original attacks continued and the patient died quite suddenly, apparently from paralysis of the respiratory center, as it was noted that his breathing ceased some seconds before his heart stopped beating.

Necropsy (eleven hours after death).—The body is that of a well-developed, well-nourished, adult mulatto male. Rigor mortis is well marked. The skullcap,

brain case, sinuses, vessels, and membranes and brain are normal. The brain weighs 1,180 grams. There is a slight excess of fluid in the pericardial sac, otherwise the pericardial membranes are normal. The heart is hypertrophied and weighs 510 grams. On section all the valves are found to be normal except the aortic. The cusps of the aortic valve are calcareous, shrunk, and distorted, and apparently encroach on the lumen of the aortic orifice. On the walls of the ascending part of the arch of the aorta are numerous calcareous plates, especially well marked around the orifices of the coronary arteries. The pleural membranes are normal. The lungs are normal. The right lung weighs 510 grams and the left lung weighs 535 grams. On the convex surface of the spleen the capsule presents evidences of an old perisplenitis. There is an area of dense, white, fibrous tissue, 9 cm. in length, 6 cm. in width, and 1 cm. in thickness. The parenchyma is normal; it weighs 254 grams. The kidneys are normal. The right kidney weighs 170 grams and the left weighs 190 grams. The genito-urinary system is normal. The liver is normal; it weighs 1,760 grams. The digestive tract is normal. The spinal cord was not examined.

H. S. M.

S. W.

J. M. G.

CASE 3.

I. R. (colored seaman); aged 48 years; nativity, Virginia; admitted to the United States Marine Hospital, Cincinnati, Ohio, October 21, 1897; died February 24, 1898.

History.—Patient admitted complaining of shortness of breath and swollen feet. Said he had been in apparently good health until seven or eight weeks prior to admission, at which time he began to have severe attacks of dyspnea when in recumbent position. Patient had two brothers die of phthisis. Did not know cause of father's death. Mother and two brothers living and in good health. Has had the ordinary diseases of childhood. Says he had syphilis in 1866. Acute articular rheumatism in 1884; admits alcoholism. Physical examination: Marked pulsation of carotid, epigastric and brachial arteries. Apex beat displaced toward the axillary line. Cardiac dullness considerably increased in transverse diameter. A loud blowing murmur, diastolic in time, heard most distinctly at second right intercostal space. Urine contained a large amount of albumen. Patient was given 10 drops of digitalis three times a day, also large doses of epsom salts every two or three days. He appeared to improve under this treatment for a time, but gradually grew worse and died February 24, 1898, at 2.15 a. m.

Necropsy (seven hours after death).—Owing to fact that body was claimed by relatives, only a partial autopsy was made, viz, of chest. Post-mortem lividity and rigidity well marked.

Pericardium contained about 200 c. c. of fluid. Left ventricle markedly hypertrophied; right ventricle also enlarged to some extent. Aortic and mitral valves thickened and incompetent, were covered with vegetations. Also evidences of fatty degeneration along aorta. Weight of heart, 1,024 grams. Lungs congested, otherwise normal.

C. B. R.

W. A. W.

CASE 4.

Mitral.

H. K. (colored seaman); aged 27; nativity, Michigan; was admitted to United States Marine Hospital, Cincinnati, Ohio, April 21, 1898; died May 19, 1898.

History.—Patient on admission complained of excessive shortness of breath. Had acute articular rheumatism in 1887, affecting all joints of body. Admitted excessive alcoholism. Physical examination revealed a loud blowing murmur,

heard most distinctly at apex. Precordial dullness markedly increased. Cyanosis also present. Patient very nervous and unable to retain anything on stomach but milk. Was given 10 drops of digitalis three times a day, also morphia to control cardiac asthma, from which the patient suffered severely at times. He continued to grow steadily worse, and died at 4 p. m., May 19, 1898.

Necropsy (three hours after death).—Post-mortem rigidity well marked. Cerebellum markedly congested; weight, 1.568 grams. Left lung adherent to chest wall, anteriorly and posteriorly; weight, 512 grams. Right lung normal; weight, 704 grams. Pericardium contained about 250 c. c. of fluid. Heart: Left ventricle very much hypertrophied, right ventricle also so to a slight degree. Mitral and aortic valves thickened, incompetent, and covered with vegetations. Liver showed cirrhotic changes; weight, 1.632 grams. Kidneys: Right, weight, 166 grams; left, weight, 208 grams. Both kidneys contained old cicatrices, probably syphilitic. Other organs normal.

C. B. R.
W. A. W.

CASE 5.

Pneumonia (lobar).

H. T. (colored seaman); age, 31; nativity, Virginia; was admitted to the United States Marine Hospital, Cincinnati, Ohio, March 14, 1898; died March 26, 1898.

History.—Patient was admitted to hospital complaining of chills and fever and feeling badly all over. Had been having chills and fever for about a week before applying for admission, the paroxysms occurring every other day. On March 21 the patient developed signs of pneumonia, the right middle and lower lobes being affected. Temperature, 40.1; respirations, 50; pulse, 120. Cough severe and expectoration rusty. Patient was given supportive treatment but gradually grew worse, being delirious for two days before death, which occurred March 26, 1898, at 2.15 a. m.

Necropsy (nine hours after death).—Dura slightly adherent; pia somewhat injected. Brain normal; weight, 1,475 grams. Lungs: Left lung very much retracted and contained a number of old tubercular deposits; weight, 640 grams. Right lung adherent to chest wall anteriorly and posteriorly and in a state of red hepatization, also contained several tubercular deposits which had become organized; weight, 608 grams. Pleura contained about 500 c. c. of fluid. Balance of organs found to be in a normal state.

C. B. R.
W. A. W.

CASE 6.

Rupture of aortic valves—Malarial fever.

E. J.; aged 21; nativity, Finland; admitted to the marine ward, German Hospital, Philadelphia, Pa., October 23, and died October 28, 1897, at 10 p. m.

History.—Family history is excellent. Denies the use of tobacco or alcohol; also denies venereal disease. Before the present illness he does not remember ever having been sick. About three weeks ago he commenced to feel badly; shortly after this he had a chill, which was soon followed by a fever and sweat. He had pains in the lumbar region, in the legs, and a severe headache. His appetite remained good throughout. The above paroxysms were repeated at intervals of a few days (two) for about a week, when his vessel put in at a port where there was a marine medical officer. Here he received some medicine and was somewhat benefited, but soon after he became worse. On admission to hospital he was very weak—almost unable to walk without assistance. The knee jerks

was absent. Tongue somewhat coated, broad, and flabby. Spleen extended to costal margin. Lungs were normal throughout. Heart was overacting, with an especially loud second sound, best heard at the second right costal cartilage. Pupils reacted to light and accommodation. Was unable to approximate the fingers of one hand with those of the other.

Necropsy (twelve hours after death).—He was 5 feet 8 inches in height. Post-mortem lividity was slight; rigor mortis was especially marked, being broken up with the greatest difficulty. The pupils were slightly dilated. The body was not much emaciated, the general nourishment being good. The heart weighed 290 grams after opening, was soft and flabby, but no macroscopical evidence of fatty degeneration. The pericardial sac was normal and contained a small amount of serum. By the hydrostatic test the aortic valves were found to be incompetent, the cause of which upon opening was found to be two small rents or tears in one of the leaflets. One was transverse immediately below the "line of contact;" the other one was a longitudinal tear near the margin of the leaflet. The appearance of the tears would indicate that they were quite recent. The mitral, pulmonary, and tricuspid valves were found to be competent. The right ventricle held 93 c. c. of water; the thickness of the wall of the right ventricle was found to be that of the left ventricle as 1 to 3. The wall of the left ventricle was, as far as macroscopical examination showed, normal, and the cavity held 93 c. c. of fluid. The thoracic aorta was found to have very small atheromatous spots (about 1 mm.), especially at points where the artery gave off branches. The abdominal aorta was found to be perfectly normal throughout its entire course. There was nothing abnormal observed as regarded the other arteries and veins. The nares and larynx appeared normal, except that they were filled with mucus. In the middle lobe of the right lung small areas of hypostatic congestion were found; also in the lower part of the upper left lobe posteriorly. The left lung weighed 460 grams. The pleural cavity contained a normal amount of serum and had no adhesions anywhere. The right lung weighed 520 grams; the pleural cavity was normal, without the slightest evidence of adhesions. The organs on inspection were found in their normal position; the serum was clear, transparent, and of a light straw color. The peritoneum was found normal. The tongue was heavily coated with a whitish fur. The pharynx was found to contain somewhat more than the normal amount of mucus, but otherwise was in a normal condition. The oesophagus contained a small amount of food which had regurgitated from the stomach; it was unobstructed throughout. The stomach contained a small amount of partially digested milk; also one quinine tablet, which was undissolved. The antrum pylori was found to be somewhat indistinct and difficult to make out; the proximal constriction of the pyloric end did not appear to be present. The inside diameter of the pylorus was 1.2 cm. The inside diameter of the cardiac orifice was 2.5 cm. The small intestine was normal, and when water was put in it under pressure it took 20 pounds to rupture it; the interior upon opening was found to be in good condition. The large intestine was nearly free from feces, but much distended with gas. The appendix was 12.5 cm. in length. The rectum was normal. The liver was much enlarged, very dark in appearance, and deeply congested; weight of liver, 2,090 grams. The gall bladder and ducts were found patulous, the gall bladder being distended with normal bile. The pancreas was very friable, but otherwise normal; weight, 150 grams. The left kidney was slightly congested; weight, 175 grams. The right kidney was somewhat more congested, but otherwise normal; weight, 170 grams. The pelvis and ureters were patulous. The bladder was well distended with urine, but otherwise normal. The prostate gland was not enlarged; the urethra had no strictures. The right and left suprarenal capsules appeared much smaller than normal, and weighed 10 grams each. The spleen was much enlarged

and extended to the costal margin; it was deeply congested; weight, 350 grams. Head and scalp were to all appearances normal, the skull being of about an average thickness. The membranes of the brain were normal. The brain was in good condition and weighed 1,450 grams. The spinal canal was not examined, because the body was nearly normal in every other respect and the cause of death was well established. There was no microscopic examination of any of the tissues. The cause of death seemed to be clear, especially in view of the clinical history of the case. Two days before his death, after being nearly exhausted from the effect of an untreated malaria, he walked to the hospital (at least 2 miles). The extra strain to which his heart was put caused the tears in the leaflet of the aortic valve. A partial acute dilatation followed. This, with his general exhaustion, was the cause of his speedy death.

F. I.

CASE 7.

Mitral—Chronic pleurisy.

A. B.: aged 23 years; nativity, Nova Scotia; was admitted to the United States Marine Hospital, Boston, Mass., March 18, 1898; died April 22, 1898, at 1 a. m.

History.—When admitted to the hospital patient gave a history of a prolonged attack of rheumatism during the previous summer, and of a sickness he called "grippe" only two months since, and from which he had not yet recovered. Physical examination revealed a loud systolic mitral heart murmur. The apex beat was displaced downward and to the left of the nipple. Over the right lung was complete flatness, vocal fremitus and voice sounds absent. The only other symptoms obtainable were debility, dyspnoea on exertion, and some sore throat, with a temperature of 38° C., which, however, became normal in a few days and remained so. There was no development of any marked symptoms other than increasing weakness and more forcible and irregular heart action, with weak pulse, until the morning previous to his death, when they became very pronounced, and dyspnoea set in. A brief period of unconsciousness preceded death.

Necropsy (ten hours after death).—General nourishment good; post-mortem lividity and rigor mortis slight; pupils dilated. The heart weighed 470 grams. Its pericardial sac contained 25 c. c. of fluid. The aortic, pulmonary, and tricuspid valves were competent. The mitral valve was incompetent and its cusps were shortened, thickened, and bound down by adhesions. The left ventricle was much hypertrophied. The left lung weighed 1,270 grams. It was deeply congested. At its apex was a small tubercular deposit; posteriorly there was some solidification, while at the base it was slightly cedematous. The pleural cavity was normal. The right lung weighed 600 grams. It was compressed and carnified, and on section was deep red in color, and showed complete solidification. It gave no crepitation whatever. The pleural cavity contained 1,076 c. c. of fluid, which deposited a thick white sediment on standing. The pleura was greatly thickened, and was covered with a thick deposit of fibrin, giving it a shaggy appearance. At the apex posteriorly were a few bands of adhesion. The gastro-intestinal tract was normal throughout. The liver weighed 2,020 grams. On section it presented evidence of slight passive congestion. The gall bladder was empty. The pancreas weighed 100 grams and was normal. The left kidney weighed 175 grams and was normal. The right kidney weighed 160 grams. At its upper extremity was a large urinary cyst containing about 3 c. c. of urine, and on its anterior surface there were several smaller ones. On section the medullary portion was seen to be slightly congested. The urinary bladder, urethra, and prostate were normal. The suprarenal bodies weighed each 35 grams, being unusually large. The spleen weighed 235 grams and was normal. The brain weighed 1,350 grams and was apparently normal. The membranes of the brain were much congested.

F. W. U.

H. W. W.

CASE 8.

Mitral (congenital diminution in caliber of the colon.)

M. S.: aged 42 years; nativity, District of Columbia; was admitted to the United States Marine Hospital, Port Townsend, Wash., May 17, 1898; died June 1, 1898.

History.—Upon admission to hospital the following history was elicited. He stated that he had never suffered from rheumatism, but had been very dissipated for the past twenty years, drinking a pint or quart of whisky almost every day, in fact all he could obtain. During the same period he had used tobacco excessively. His system had long resisted the abuse, and his health had been good until two years ago, when he first noticed some shortness of breath on exertion. Instead of now stopping his dissipated habits, he consumed even greater quantities of alcoholic beverages, and only ceased using them two weeks before his admission, when he became so ill that he was completely prostrated, and had to quit work and apply for treatment. When the patient came under observation he was suffering severely from cardiac asthma, the attacks of shortness of breath causing the sensation of impending dissolution. The paroxysms recurred several times during the day and usually lasted one or two hours. He did not suffer any pain except that incident to the feeling of suffocation. The pulse was quick and small. Upon examination the apex beat was seen markedly displaced downward and to the left; percussion showed considerable hypertrophy of the heart, especially the left ventricle, and auscultation revealed a loud, blowing murmur over the apex; this replaced the first sound of the heart and was transmitted to the left axilla. A diagnosis of insufficiency of the mitral valve was made. The physical signs over the other valves were negative. Examination of the lungs showed the presence of some oedema of the lower lobes, and the patient expectorated some frothy sputum containing small quantities of blood. His legs were much swollen. He was placed on full doses of digitalis, and under its use the pulse became slower, fuller, and less compressible, but the dyspnoea was not benefited. Small doses of morphine and atropine were administered when the paroxysms were especially severe, and a dose given hypodermatically always promptly relieved the attack and insured the patient several hours of sleep and comparative ease. In fact it was the only medication that seemed to be of much value for the distressing dyspnoea. The patient was kept at rest and cautioned about making any exertion. His condition remained about the same until the morning of June 1, when, disobeying instructions, he walked to the water closet, a distance of about 15 feet from his bed, and in doing so fell to the floor and expired in a few seconds.

Necropsy (twelve hours after death).—External appearances: Body fairly well nourished, the lower extremities oedematous; rigor mortis marked, and post-mortem lividity slight. Thoracic cavity: The pericardium was normal and contained only a small quantity of fluid. The heart was much enlarged, weighing 635 grams, and was distended with semicoagulated blood. The wall of the left ventricle was much hypertrophied, being 3 cm. thick; the cusps of the mitral valve were slightly diseased and the valve was incompetent. The aortic valves were normal, but the aorta showed numerous atheromatous deposits. The valves in the right side of the heart were normal and the wall of this ventricle was not much thickened. The left pleural cavity was practically obliterated by old adhesions, which, however, were more pronounced over the upper than the lower lobe of the lung on this side. The right pleura was normal. Both lungs were oedematous, but showed no other evidences of disease; the right weighed 785 grams and the left 650 grams. The larynx and trachea presented no evidences of disease. Abdominal cavity: The vermiform appendix was free and normal. The most interesting thing noted in connection with the examination of the viscera

in this cavity was the remarkably small size of the colon, which only measured 2.5 cm. in diameter, the sigmoid flexure being only 2 cm. in breadth, while the hepatic and splenic flexures of this portion of the alimentary tract did not measure more than 3 cm. in width. The cœcum was of normal size, but the diminished caliber of the colon existed at its commencement and continued throughout the entire length. The rectum was one-third smaller than normal. Some adhesions existed between the spleen and splenic flexure of the colon, and also between the gut and the abdominal wall in this locality. These evidently produced no constriction of the intestine, and the patient suffered no inconvenience from the diminished caliber of the colon. This condition was no doubt congenital. The band-like arrangement of the longitudinal muscular fibers was maintained until about the middle of the descending portion, when this was lost and these fibers formed a continuous outer covering, this coat being quite thick in the sigmoid, where the muscular tissue had been largely replaced by fibrous tissue. The stomach and small intestines were normal, and the mucous membrane of the large intestine showed no pathological changes. The liver had undergone fatty degeneration, both the external and cut surfaces being quite yellow. There were also numerous minute depressions on the external surface and the lobules were quite well marked. The organ weighed 1,765 grams. The spleen weighed 135 grams and was normal. The pancreas weighed 65 grams and exhibited no pathological changes. The kidneys were somewhat larger than normal and showed several depressions on their outer surface, which on section were found to consist largely of connective tissue, as of an old cicatrix. The left kidney weighed 225 grams and the right 185 grams. The ureters, bladder, and urethra were normal.

J. C. P.

CASE 9.

Mitral regurgitation—General dropsy.

C. B.: aged 56 years; nativity, Sweden: was admitted to the United States Marine Hospital, port of San Francisco, Cal., February 14, 1898; died March 1, 1898.

History.—Patient was treated in this hospital for mitral insufficiency, but was discharged at his own request January 28, 1898. At that time the heart had not fully compensated. He returned February 14, 1898. He was dyspnoic, his limbs were swollen, and his abdomen distended with fluid. Upon examination lungs were found to be normal. The heart dullness was increased to the left anterior axillary border. The apex beat was diffuse and upon auscultation a systolic murmur was heard at the apex. The patient was dyspnoic while at rest, his legs were swollen, and his abdomen was distended with fluid. Patient was put on milk diet with infusion of digitalis, and morning doses of epsom salts. The cedema increased. The scrotum was so swollen and painful that it was tapped and about a pint of fluid withdrawn. The patient died suddenly March 1, 1898, at 1.40 p. m.

Necropsy (twenty-three hours after death).—The body is that of a well-developed and markedly cedematous adult, white, male; rigor mortis well marked. The lower extremities, abdomen, and scrotum are greatly swollen. The face and neck are cyanotic. A part of the glans penis is absent, the prepuce being adherent to the part remaining. Encephalon is normal; weight of brain, 1,450 grams. The pericardial sac contains 75 c. c. of serous fluid. Heart is greatly dilated. The aortic valves are normal. There is a marked thickening of the edges of the mitral valve. Weight of heart, 870 grams. The pleura at the base of the left lung shows a few adhesions, while on the right side the adhesions are general. The left pleura contains 250 c. c. of serous fluid. Both lungs are in a condition of hypostatic congestion. Weight of left, 680 grams; of right, 940 grams. The peritoneal cavity

contains 1,000 c. c. of serous fluid. The capsule of the spleen is thickened, adherent, and covered with calcareous deposits. Spleen itself is normal; weight, 280 grams. Right kidney is normal, except that the two central pyramids are absent; weight, 235 grams. The left is lobulated; weight, 260 grams. The remainder of the genito-urinary organs are normal. Liver is normal; weight, 1,700 grams. Gall bladder is distended with bile. The rest of the gastro-intestinal tract is normal. The spinal cord was not examined.

H. S. M.

R. R. H.

J. M. G.

CASE 10.

L. T.; aged 32 years; nativity, Missouri; admitted to the United States Marine Hospital, St. Louis, Mo., December 29, 1897; died, January 5, 1898.

History.—This admission was the patient's second to this hospital. He was admitted August 17, 1897, complaining of heart disease, and was discharged October 21, 1897, improved. Patient was advised on discharge to get medicine regularly from the dispensary; this he says he did, but his condition did not improve. Becoming suddenly worse, December 29, 1897, the ambulance was sent for him. His condition on entrance was critical, dyspnoea being distressing, cardiac disturbance great, and legs œdematous. Physical examination (December 29, 1897): Dyspnoea distressing. Patient's respirations 46 per minute on entrance. Legs greatly swollen. Jugular pulsation marked. Great cardiac disturbance, the whole cardiac area heaving and showing great hypertrophy of that organ. Palpation: With the palm of the hand over the area of cardiac disturbance, a thrill is felt, "purring" in character. Arteries are atharomatous. Pulse (radial) is intermittent and irregular, and very weak. Pitting of legs on pressure. Tactile fremitus is absent at the base of the right lung and extending up to the third rib. General glandular enlargement. The liver can be felt greatly enlarged, extending in a curve six cm. below the right costal margin. Percussion: The area of cardiac dullness extends from the upper border of the third rib above to six cm. below the nipple, and from the edge of the sternum within to beyond the axillary line without. A flat note is elicited over the right side of the chest, extending from the base of the lung below to the third rib above. Above this the note is tympanitic. Auscultation: A soft systolic murmur is heard at the apex of the heart, the second sound being somewhat accentuated. Numerous bubbling râles are heard over the right side of the chest. Breathing is bronchial in character. There was a temporary albuminuria the day after entrance, with a scanty secretion of urine; but this disappeared in a day. Notwithstanding all treatment, the patient's condition continued to become worse, his dyspnoea increasing and his heart becoming weaker. He died on the morning of the 5th of January, at half past 1 o'clock.

Necropsy (twelve hours after death).—Body that of a man apparently 30 years of age. Height 5 feet 6 inches. Muscles are well developed, with adipose tissue slight in quantity. Both legs are abnormally enlarged. The right is 45.5 c. c. in circumference and the left 47. The lower third of the left leg is of a dark-red color, with a cicatrix 3 cm. long and 1 wide at its center. There is a scar in the left groin 6 cm. long. Rigor mortis slight. Hypostatic congestion over the back marked. Eyelids only partially closed. No foreign material about any of the apertures of the body. The chest is full and the abdomen somewhat distended. Cranial cavities. There having been no symptoms of disease of the brain, it is thought unnecessary to examine that organ. Thorax and abdomen: A long incision is made from the larynx to the pubic symphysis. The adipose tissue of the abdominal wall is three-quarters of a centimeter thick. On opening the abdominal cavity the liver is seen presenting and greatly enlarged. The intestines bulge

out, being moderately distended with gas. There is no foreign body in the abdominal cavity. The arch of the diaphragm extends on the left side to between the fourth and fifth ribs and on the right about 2 cm. lower. Thorax: The right pleural cavity is opened by the removal of the sternum, as the right pleura was adherent to its under surface. This pleural cavity is lined with a thick, grayish, purulent membrane and contains 3,200 c. c. of a dark brown fluid. The right lung very small, contracted, adherent to the chest walls, and lies in the upper posterior part of the chest. It has a ragged contour and is of a grayish slate-color. The base is a mass of broken-down purulent tissue. On section the apex is found to contain a cavity 5 cm. wide by 5 long. The only part of the right lung which is in a healthy condition is a small portion at its posterior and upper part. This lung weighs 600 grams and is 23 cm. long by 17 wide. The left lung is pushed back by the enlarged heart. It is adherent to the diaphragm. Its weight is 450 grams and is 20 cm. long by 15 broad. It is to the touch crepitant, of a grayish color externally and a mahogany color on section, considerable blood oozing from its cut vessels. The pericardium is now opened and 100 c. c. of a yellow serum removed. There are no adhesions. The heart is seen to be enormously hypertrophied. It is 19 cm. long by 16 broad and weighs (without blood) 600 grams. The cardiac veins were distended with blood. The right auricle is opened and 25 c. c. of black clotted blood removed. The right ventricle contains 250 c. c. of this black clotted blood. The left auricle contains too small an amount to be estimated, while the left ventricle contains 125 c. c., together with an organized membrane 7 cm. long by 2 broad and very thin. The wall of the left ventricle is 3 cm. thick, that of the right being $1\frac{1}{2}$. The arterial system is empty. Upon removing the heart for further examination the initial valve is found insufficient. The two segments do not coapt by a considerable interval. Several hard nodules the size of bird shot are felt on one segment. The other valves appear sufficient. The left kidney is 15 cm. long, 8 wide, and 5 thick, and weighs 280 grams, the right being 14 cm. long, 8 wide, and 5 thick, and weighs 230 grams. Considerable fat is found in the pelvis of each organ, the cortical portion being thickened and the pyramids ill defined. The spleen is enlarged, measuring 16 cm. long, 3 wide, and 6 thick, weighing 550 grams. It feels hard, and on section is of a dark red color. The bladder is contracted and contains no urine. The stomach is 26 cm. long by 7 wide and weighed 130 grams. It contained about 5 c. c. of yellow slimy mucus. The walls have a healthy appearance. The liver is enormously enlarged, being 28 cm. long, 21 broad, and 10 thick, and weighed 1,950 grams. Its external surface is smooth and of a reddish-gray color. On section it is of a mottled-red color, and is hard to cut. Considerable blood exudes from the cut vessels. The intestines are moderately distended with gas. There are no adhesions and nothing abnormal is to be seen.

R. C. C.

W. G. S.

CASE 11.

Mitral stenosis.

J. McG.; aged 27; nativity, Ireland; admitted to United States Marine Hospital, Stapleton, N. Y., September 10; died November 14, 1897.

History.—Had rheumatism first, eight years ago, and has had it twice since that time; the last time in this hospital in 1896. Gonorrhea once, about ten years ago. Claims he has had some "heart trouble" for about five years. About four weeks ago his legs began to swell and feel stiff and sore. This gradually extended up his thighs, and finally his abdomen also began to swell. He now has marked edema of both legs and thighs and fluid in belly as high as the umbilicus. Dyspnoea

and pain in the hepatic region. Occasional cramps in belly. Tongue coated. Bowels fairly regular. Urine scanty. Examination on admission showed marked œdema of legs, thighs abdominal walls, penis, and scrotum. Considerable ascitic fluid. Face dusky. Pulse small. Lungs: Decreased resonance at bases behind. Heart very little enlarged, apex beat being about in normal position. Marked thrill on palpation over region of apex. On auscultation aortic valve normal, pulmonic and tricuspid also apparently normal. Over the mitral area heard a systolic and a diastolic murmur. Systolic sound not heard in back. Urine scanty and albuminous. Patient's bowels were moved with magnesia sulphate, and he was put on tincture digitalis and strychnia sulphate. Kept in bed and given a milk diet. Two days later a paracentesis of abdomen was done and 1,600 c. c. of a muddy fluid withdrawn. Under this treatment, with addition later of strophanthus, he improved slightly; his color grew better, urine increased, and œdema lessened. His improvement, however, was transitory. On September 16 he began to retch and to vomit occasionally, and from this time till his death he suffered more or less with nausea and vomiting, making it difficult at times to give him sufficient nourishment. On October 1, his abdomen having again filled, another paracentesis was done and about 3,000 c. c. fluid withdrawn. He suffered a good deal from insomnia, and both morphia and codeine were given. The heart tonics and stimulants were continued steadily, but he did not improve. On October 18 the following note was made: Apex beat a little up and out, but not beyond mammillary line. It can be observed by inspection. Pulse arrhythmical and arteries hard. A thrill can be felt all over the præcordium and occurs with the murmur heard. On auscultation is heard a rather harsh, somewhat blubbery murmur at the apex and left of sternum and in left upper back. The time of the murmur is very hard to determine, but it is either diastolic or præ systolic. It can not be heard at right of sternum (here sounds are clear). Its point of greatest intensity is close to left edge of sternum, at third interspace; transmitted slightly to left. Urine highly albuminous and scanty. His nausea and vomiting, sleeplessness, pains in chest, and dyspnœa grew very distressing, and despite various symptomatic remedies and the constant use of digitalis, strychnine, and strophanthus, with easily assimilated food and alcohol, he gradually grew worse, and died November 14 at 10.55 p. m.

Necropsy (thirty-seven hours after death).—White man; about 30 years of age; dark hair and mustache; blue eyes; about 5 feet 6 inches high. The entire body greatly swollen, and an incision into the tissues showed them everywhere infiltrated with fluid. No rigor mortis and very slight levidity over back, but the skin over the body everywhere had a dusky tinge. Calvarium removed, and the cranial cavity and its contents found normal in all respects, save for a slight quantity of fluid in the lateral ventricles and some general venous congestion. Thorax: Both sides of the thorax contained a moderate quantity of a cloudy fluid. The left lung was bound down by one or two small adhesions. The right was bound by several rather strong adhesions and was much congested behind. The pericardium contained a considerable quantity of clear amber fluid. The heart was enlarged; weight, 500 grams, and its muscular tissue not very firm. The walls of the left auricle greatly hypertrophied. The aortic and pulmonary valves normal. The mitral valve leaflets were thickened and bound together in such a way as to leave the left auriculo-ventricular orifice a mere buttonhole-like opening. Scattered over the valve and around the orifice were a number of calcareous vegetations. The tricuspid valve leaflets were normal, but the right auriculo-ventricular orifice was quite large, easily admitting four fingers at once, thus leaving the valve relatively incompetent. Abdomen: The whole cavity filled with a muddy yellowish fluid. The omentum and mesentery everywhere thickened, soft, and of a dark venous hue. Kidneys: The right small; weight, 125 grams,

and dark. Its capsule stripped off easily, leaving a fairly smooth surface exposed, with here and there large indentations. On section hard, and showed considerable venous oozing. Cortex lessened. The left much larger (weight, 239 grams), and but for a small yellowish-white spot on its surface, which seemed to be necrotic and extended for about one-fourth inch into substance of organ, it was in all respects similar to the right. Both adrenals dark purple in color and very soft. The ureters normal, except that their walls were œdematous. Bladder and other genito-urinary organs normal. Spleen: Weight, 170 grams; capsule pale and thickened and could not be stripped off. The tissue of the organ dark and friable. Liver: Weight, 1,500 grams; capsule stripped off easily; surface rough; color dark, and contained a great deal of venous blood. Liver on section showed the nutmeg condition. Stomach: Its walls thickened, and the mucous membrane a dark grayish-brown color and somewhat softened, with a deposit of mucus all over it. In one place a number of small ulcers, each filled with a dark clot of blood. The stomach contained a small quantity of food mixed with blood. Pancreas: Head of pancreas thickened and quite hard.

C. H. L.

G. W. S.

CASE 12.

Mitral insufficiency—Chronic parenchymatous nephritis.

O. J.; aged 32 years; nativity, Norway; admitted to United States Marine Hospital, Delaware Breakwater, Del., October 22, 1897; died, November 18, 1897.

History.—Admitted with œdema of feet and legs of three days' standing. Perfectly well previously, except had chills and fever four months ago, from which he recovered. Heart's action rather feeble; presystolic murmur heard loudest at second left intercostal space near edge of sternum. Shortly after admission had a chill, followed by fever and sweating; during chill a good deal of dyspnoea. Relieved by digitalis and whisky. Urine albuminous, and contained granular casts, débris, and blood corpuscles. Color, dark red. Had chill at same hour for three successive days, when quinine was given, after which the chills stopped. Urine gradually increased in amount until it reached 3,500 c. c. in twenty-four hours; on admission the amount had not exceeded 500 c. c. in twenty-four hours. After ten days, it was learned that patient had suffered from syphilis, and anti-syphilitic treatment was at once commenced, but without apparent effect. On November 16 had severe hemorrhage from the lungs, which was relieved after six hours' treatment. Had another severe hemorrhage from the lungs on November 18; on each occasion in the early morning hours. The second hemorrhage was checked much easier than the first. Patient died suddenly at 8.50 a. m., while lying quietly in bed, talking with another patient, November 18, 1897.

Necropsy (thirty hours after death).—Body of a male, 6 feet 1 inch long; general nourishment good. Pupils well dilated; slight post-mortem lividity on breast where sinapism had been. Rigor mortis well marked. Incision in median line: intestines distended with gas; small intestines stained with bile around gall bladder, which was full. Vessels slightly injected in the jejunum. Bladder distended. A good deal of ascitic fluid escaped on opening the abdomen; color, pale straw. Diaphragm rises to between the fifth and sixth ribs. Lungs distended; front part of the lobes slightly blood stained; rest of lung tissue visible of a grayish color. Pericardium normal in appearance; on opening pericardium it was found to contain about 150 c. c. of pale straw colored fluid. Heart, external appearances normal, both in size and appearance. On opening heart, found that left ventricle contained a closely adherent ante-mortem clot. Left auricle had large post-mortem clot. Right ventricle empty; ante- and post-mortem clots in right auricle. Post-mortem clot in vena cava, extending into the auricle. Valves all normal,

except the mitral, which was roughened and insufficient; pulmonary valves normal. Lung tissue normal in structure, but was congested and oedematous. Small amount of blood and mucus escaped from smaller bronchi on section. Spleen normal. Kidneys: Both kidneys were much enlarged, pale in appearance, and smooth; no mottling; capsule stripped readily; on section, corticle portion was found to be broader than usual, and of a pale, yellowish-white color; markings distinct; no evidences of any hemorrhage in to the substance of kidney. Liver: Somewhat enlarged; firm; serous coat cloudy; gall bladder distended. Color, yellowish red; increased connective tissue. Large intestine considerably smaller than usual; about the size of the small intestine. Brain: Normal; lateral ventricles contained a small amount of fluid. Spinal cord normal. Other organs normal. Cause of death: Heart failure from mitral insufficiency; chronic parenchymatous nephritis.

C. P. W.

CASE 13.

Mitral.

J. W. D.; aged 54 years; nativity, Maine; admitted to United States Marine Hospital, port of New York, N. Y., June 25, and died June 27, 1898.

History.—Upon admission patient complained of oedema of legs, of dyspnœa, and of palpitation and pain in region of heart. He also felt dizzy and was very weak. Examination of his heart showed it to be greatly hypertrophied. The apex beat was plainly visible $6\frac{1}{2}$ cm. below the left nipple and $2\frac{1}{2}$ cm. without the nipple line in the sixth interspace. There was heaving of the left side of the chest wall upon each cardiac impact. Pulsation of the jugular veins was marked, especially upon the right side of the neck. A slight epigastric pulsation was also seen. His radial pulse was rapid, weak, and extremely irregular, as was the cardiac action. Arteries were sclerotic. Upon palpation no thrill could be felt over the heart. Percussion showed great cardiac hypertrophy, the area of cardiac dullness being much increased. A marked murmur, systolic and diastolic, is heard over the aortic interspace, the aortic second sound being accentuated. A systolic murmur also is heard at the apex and over the ensiform cartilage. Examination of lungs showed them to be normal. His urine was examined twice. It was found to be normal. Under treatment the oedema of his legs subsided, the dyspnœa disappearing. His general condition was much improved, but the action of his heart remained rapid and very arrhythmic. At evening sick call, June 27, 1898, he expressed himself as feeling much better, but half an hour afterwards he suddenly became unconscious, his breathing being difficult and stertorons. The heart action was rapid and very irregular. Patient remained in this condition till half past 12, when his breathing became extremely shallow, finally ceasing at 1 o'clock, the heart's action having failed a short while before this.

Necropsy (thirteen hours after death).—Body that of a man apparently 60 years of age. Post-mortem staining over the back of limbs and trunk very pronounced, as is the rigidity. Pupils are evenly contracted. Upon opening the thorax the left pleural cavity is found to contain 500 c. c. of serous fluid, the right 50 c. c. The pericardium contains 150 c. c. of serum. The heart is seen to be greatly hypertrophied, weighing 515 grams. An area of congestion, darkish red in color, 4 cm. in diameter, resembling a hemorrhagic infarct, is seen over the left ventricle. Upon incising, the congestion is seen to extend through the whole thickness of the muscular wall, a few drops of dark red blood exuding from the cut surface. A moderate quantity of fluid blood is found in the heart cavities. There are no clots. On section, the walls of the heart are found to be greatly thickened, especially that of the left ventricle. The leaflets of the mitral valve are seen to be greatly thickened and puckered. Plates of sclerotic tissue are felt in them.

The valve is not competent (it does not hold water). The chordæ tendineæ are thick and the musculi papillares hypertrophied. The other valves are slightly sclerotic, but appear to be competent. The pleura of the right lung is adherent to the chest wall. Each lung weighs 750 grams, and is otherwise normal. The abdominal cavity contains 200 c. c. of serous fluid. Position of organs normal. The intestines are seen to be considerably congested. The liver weighs 1,400 grams. It is dark brown in color and of normal appearance and consistence. The spleen weighs 225 grams and is, to all appearance, normal. The right kidney weighs 175 grams, the left 150. The kidney tissue is, microscopically, normal. The brain weighs 1,400 grams. It is very anæmic. No hemorrhages or any other lesion can be seen externally or on section.

R. C. C.
G. W. S.

CASE 14.

Mitral.

I. B. aged 42 years; nativity, Mississippi; admitted to United States Marine Hospital, Evansville, Ind., February 7, 1898; died February 25, 1898, at 1.25 p. m.

History.—On admission complained of shortness of breath and swelling of ankles and feet. Lungs normal; examination of heart disclosed murmur with greatest intensity in mitral area and systolic in time. He continued about the same. Feet and ankles would be larger one day and smaller the next. He died suddenly at 1.25 p. m., February 25, 1898.

Necropsy (twenty and one-half hours after death).—Rigor mortis marked. General anasarca. Body well nourished. Brain appeared to be little softer than usual. Falciform process ossified; otherwise normal; meninges normal. Heart: Hypertrophied; weight, 640 grams. Ante-mortem clots in heart. Pulmonary valves normal. Tricuspid valves thickened along edges and contained calcareous deposits. Aortic valves somewhat thickened. Mitral valves thickened and stiff with calcareous deposits and were incompetent. Aorta dilated and covered with calcareous deposits. Pericardium contained about 100 c. c. fluid, clear and straw colored. Right lung normal; some engorgement; weight, 595 grams. Left lung normal; some engorgement; weight, 590 grams. Some adhesions of pleura on left side. Clear fluid in abdominal cavity. Liver normal; weight, 1,570 grams. Spleen normal; weight, 240 grams. Right kidney enlarged; weight, 205 grams; large and white. Left kidney enlarged; weight, 229 grams; large and white. Stomach, intestines, bladder, and genitals normal.

J. H. O.

CASE 15.

Aortic and mitral.

F. M.; aged 32 years; nativity, New York; admitted to United States Marine Hospital, Cleveland, Ohio, January 18, 1898; died February 27, 1898.

History.—Family history negative. Patient had gonorrhoea several times and syphilis eight years ago. Present attack began three weeks ago with pains in the back and legs and eruption with swelling on the latter. For the past four days he has had pain in the abdomen, most severe over the right iliac region, slight cough, scanty expectoration, appetite fair, bowels regular, no history of rheumatism. Petechiæ are present on both legs and thighs, particularly on the inner surfaces. No enlargement of the joints and no pericosteal nodes. Spleen enlarged and tender on pressure. Liver dullness not increased; tenderness at costal margin. Presystolic and systolic murmur, the former best heard at base, the latter transmitted to axilla. Pulmonic seemed sound, accentuated with a sharp ringing tone at closure. Pulse 78, rhythmic, regular, and of fair volume. No dyspnoea. Respiratory system negative. Urine, specific gravity 1.017; gives diazo reaction.

January 23, 1898.—He has a rise of temperature each evening of 1° C. or over, and it falls to normal, or one-fifth degree C. above, each morning. Still complains of colicky pains in abdomen.

February 17, 1898.—Patient in about the same condition, temperature higher, and he has had diarrhea for the last two days. Urine still gives the diazo reaction.

February 18, 1898.—Discharge of foul-smelling pus from the right ear this morning. He is failing rapidly.

February 27, 1898.—Died at 3.05 p. m. Axillary temperature at death, 41.2° C.

Necropsy (twenty-four hours post mortem).—Body emaciated; rigor mortis and post-mortem staining present. Discharge of offensive pus from right ear. Scalp of moderate thickness and aponeurosis normal. Sinuses engorged; dura adherent along vertex; general leptomeningitis most marked on convexity, with effusion of lymph over sulci. Cortex congested, puncta vasculosa numerous; lateral ventricles contain much serum; choroid plexuses swollen and studded with soft granular bodies like tubercle. Glistening points of the same material are seen over and along the blood vessels in the fissum sylvii and along inferior surface of the pons varolii. Third and fourth ventricles normal. Cerebellum softened and shrunken. Motor and sensory ganglia present nothing abnormal. Pus found in the middle ear on right side, with perforation of membrano tympani. Spinal cord not examined. Chest: Pericardium normal. Considerable fluid in sac. Heart large and venous system engorged; chicken-fat clots in both ventricles, and walls fatty. Mitral valve contracted; admits two fingers; leaflets of valves thickened and on margins are numerous vegetations soft and floating free in the blood stream. Left auricle dilated. Semilunar valves of aorta covered with soft fringe-like vegetations, which diminish the caliber of the opening so that it barely admits the tip of the index finger, and one clump of vegetations, oval in shape, almost closes the opening like a ball valve. Wall of ascending aorta thickened and atheromatous. Tricuspid and pulmonary valves free from vegetations. Lungs show hypostatic congestion, contain extensive deposits of carbon, but are otherwise normal. Tubercle bacilli were found in the sputum from this man's spit cup, but the mixture must have been accidental, as the lungs showed no evidence of it. No pleural adhesions found. Abdomen: Liver very large, and superior surface of the right lobe presents a globular enlargement the size of a small apple, which on section presents nothing special except the nutmeg appearance seen throughout the organ. Gall bladder empty, contains no calculi, and is very pale in color. Pancreas normal. Mucus membrane of the stomach congested at cardiac orifice. Small intestines normal, no enlargement of Peyer's patches. Large bowel shows congestion of mucus membrane in the cœcum, and several points of superficial ulceration are noted on the posterior wall. Appendix vermiformis normal. Mesenteric glands slightly enlarged. Spleen large, oval in shape, and marked by numerous lobules, firm throughout, except inferior border, which is softened. Suprarenal capsules and kidneys large. Capsules of kidney nonadherent, cortical substance large in both organs and granular on fracture. Ureters, bladder, and generative organs normal. Microscopic examination of sections of his tissues shows cloudy swelling in the liver and kidneys.

D. A. C.

CASE 16.

Mitral and aortic.—Pericarditis.

A. R.: aged 26 years; nativity, Virginia; admitted to United States Marine Hospital, Memphis, Tenn., March 22, 1898; died May 7, 1898.

History.—Has suffered from periodical attacks of acute rheumatism for past five years or more; has no signs of syphilis and denies infection; was treated in this hospital during January for valvular lesion. On admission patient was very

weak and suffered from severe dyspnoea on slightest exertion; temperature was subnormal, 36.3, and pulse waterhammer in character; ankles and feet swollen and puffy; some ascitis. His condition improved considerably under general supportive treatment and rest in the recumbent position till about five days before his death, at which time he commenced to suffer acutely from pain in cardiac region, increased dyspnoea and cough, and some increase in ascitic fluid. His temperature during this period would rise to 38.2 every afternoon, becoming subnormal in the morning, about 36.2.

*Necropsy (eight hours after death).—*Body well nourished; eyelids puffy; feet, ankles, scrotum, and penis cedematous. Abdominal cavity contained about 1,000 c. c. fluid. Liver enlarged, dark and congested, extending to umbilicus; weight, 3,650 grams. Gall bladder nearly empty. Spleen enlarged; weight, 230 grams. Kidneys enlarged and congested, capsules not adherent; right kidney weighed 240 grams; left, 265. Stomach, intestines, and oesophagus normal. Bladder contracted and normal. Right pleural cavity contained 150 grams serum, no adhesions; left cavity obliterated by adhesion over upper lobe. Heart, weight, 420 grams; left cavities enlarged and walls thickened; mitral and aortic valves both incompetent. Pericardial surfaces covered with a shaggy coat of fibrin, giving the appearance of a Turkish bath towel. Brain weight, 1,370 grams; membranes much congested, otherwise normal.

G. M. M.

CASE 17.

Mitral and aortic.

N. B.; aged 38 years; nativity, Wisconsin; admitted to the marine ward of the St. Vincent Hospital, Portland, Oreg., June 17, 1898; died June 26, 1898.

History.—He has suffered from two attacks of rheumatic fever in the last five years, the last occurring early in May of this year. There are external signs of syphilis, although this experience is not admitted. About three years ago was operated on for strangulated inguinal hernia of the right oblique variety, a radical cure having been effected. On admission he had dyspnoea, slight cedema of the feet and ankles, irritable stomach, and scant urine. Physical examination: The heart is greatly hypertrophied; apex impulse below and to the outer side of the nipple; the cardiac action is rapid, weak, and arrhythmical; the sounds are distinguished from each other with difficulty, and murmurs, more musical than rasping, are heard over the apex and below the second right costo-sternal articulation. They are not transmitted over a large area, and there is no arterial pulsation in the superficial vessels. The pulse could hardly be distinguished in the radials. Compensation was somewhat restored by the aid of drug stimulation, and there was a noticeable improvement in his distressed condition, but later on the cedema advanced and dropsical effusions filled the cavities. The patient died in a state of coma.

*Necropsy (eleven hours after death).—*Body muscular, corpulent, and the limbs cedematous. Rigor mortis not marked. Brain: The cranial bones are thin and very brittle; the veins of the pia mater are engorged; a considerable amount of serum is found in the base; the brain weighs 1,400 grams. Thorax: Right sac contains 150 c. c. serum; right lung weighs 1,020 grams and is congested below and posteriorly. Left sac contains a similar amount of pale yellow fluid; the lung is similarly congested and has a few firm adhesions near the apex posteriorly; it weighs 906 grams. The pericardial sac is distended, occupying a considerable portion of the central chest and encroaches upon the lung to the left; it contains 200 c. c. serum. The heart is greatly hypertrophied, weighing, minus clots, 906 grams; the walls are much thickened and the cavities contain large amounts of post-mortem clots. The aortic valves are thickened and show a few

vegetations on the ventricular surface; the orifice here is contracted. The mitral orifice is also contracted, admitting only one finger; valves are greatly thickened; pulmonary valves are stretched to their full capacity. The liver is enlarged, hard, and resistant to the knife; it weighs 1.927 grams and is hard and gritty to the feel. The spleen is hard and tough, weighing 226 grams, and presenting on its anterior surface a curious congenital fissure about $1\frac{1}{2}$ inches long and one-fourth of an inch deep. The kidneys are congested; the capsules strip with ease; weight of the right, 113 grams. Bladder and other viscera are normal. Several coils of the small intestines are adherent to the right internal abdominal ring; the right inguinal canal is obliterated, and the right testicle has been removed.

R. B.

CASE 18.

Aortic and mitral.

W. F.: aged 37 years; nativity, Ohio; admitted to United States Marine Hospital, Chicago, Ill., December 14, 1897; died May 26, 1898.

History.—The patient was treated for asthma and bronchitis. He had associated with this trouble valvular disease of heart with hypertrophy. The treatment consisted mainly of iodide of potassium mixtures for the asthma, which gave him a great deal of relief. The murmur was heard with the second sound, and most distinctly at the base of the heart. He complained of shortness of breath for a number of weeks, which at times became "smothering," and he suffered at intervals from anasarca and marked dyspnoea, with a weak pulse, finally becoming very anæmic. For the anasarca caffeine citrate and glonoin were given, which gave much relief. On May 24 patient had an attack of heart failure, during which he was delirious for two days, and finally he became unconscious, and died May 26, 1898, a. m.

Necropsy (twelve hours after death).—Post-mortem rigidity and post-mortem congestion marked; body well nourished; weight, about 160 pounds; tissues all œdematous. Brain: Weight, 1.550 grams; congested; dura mater adherent; sinuses full of blood; vessels of brain dilated and congested. Membranes: All vessels dilated and full of blood; anterior mediastinum, normal. Heart: Weight, 650 grams; left ventricle thickened; right ventricle dilated and thickened; posterior leaf of mitral valve almost obliterated and glued to ventricular wall; left auricle dilated and thickened; aortic valves thickened and glued to walls; chordæ tendinæ hypertrophied; vessels normal; tricuspid valve normal; pericardium contained about 100 c. c. of fluid; pleuræ, left adherent to diaphragm; right normal. Lungs: Right, weight, 700 grams; left, weight, 530 grams; hypostatic congestion of both lungs; great vessels normal; nerve trunks normal; diaphragm hypertrophied; omentum normal in size, but infiltrated and congested; spleen, pyramidal in shape; weight, 260 grams; capsule thickened and adherent. Kidneys: Right, weight, 190 grams; cortex thickened; capsule slightly adherent; left, weight, 190 grams; normal; bladder walls thickened—contained 100 c. c. of pale urine; mucous membrane normal; prostate normal; scrotum œdematous; seminal vesicles normal; testicles small; penis atrophied; urethra normal; rectum normal; duodenum normal. Stomach large; walls thickened and congested; gall ducts normal. Liver was composed of seven lobes—weight, 1,320 grams; capsule adherent; dense connective throughout; gall bladder contained 20 c. c. of bile; ducts patulous. solar plexus normal, apparently; mesentery normal; small intestines congested and full of fecal matter; large intestine congested and full of fecal matter; vermiform appendix small in caliber and glued to cæcum; great vessels normal.

H. C. R.

H. W. S.

CASE 19.

Aortic and mitral regurgitation—Bright's disease.

M. A.; aged 31 years; nativity, Cape de Verde Islands; was admitted to the United States Marine Hospital, port of San Francisco, Cal., November 11, 1896, and died December 13, 1897, at 10.10 a. m.

History.—When admitted he complained of having suffered for over a month with pain in his chest, shortness of breath upon exertion; also had a dry cough. Physical examination showed patient to be a well-developed, well-nourished negro, male. On percussion lungs were normal, heart slightly enlarged, liver and spleen normal. Auscultation: Lungs were normal; heart regurgitant; murmurs were heard over the aortic and mitral areas. Under treatment the patient improved for a time, but later compensation failed, followed by general oedema. Paracentesis of the abdomen was performed several times. Finally the heart gradually failed, and the man died at 10 minutes past 10 on the morning of the 13th of December.

Necropsy (four and one-half hours after death).—The body is that of a well-developed, well-nourished adult negro, male. Rigor mortis is not well marked. General oedema is very pronounced. The skullcap, brain case, the sinuses and vessels, and the brain are normal. The pia mater over the vertex shows evidences of chronic exudative meningitis. Weight of brain is 1,180 grams. The pericardial sack contains 400 c. c. of a straw-colored fluid; otherwise normal. The heart is hypertrophied generally. The leaflets of the aortic valve are thickened, contracted, and covered with calcareous deposits. The leaflets of the mitral valve are distorted, shrunk, and covered with calcareous deposits. Both valves are incompetent. The walls of the aorta for a distance of 4 centimeters from its origin were thickened and calcareous. Weight of the heart is 620 grams. The parietal and visceral layers of the pleura on the right side show a few adhesions over the base. The same condition is present on the left side. The right lung, upon section, shows evidences of passive congestion; weight, 800 grams. The left lung also shows evidences of passive congestion; weight, 470 grams. The bronchial glands are enlarged. The peritoneal cavity contains 4,000 c. c. of amber-colored fluid. The spleen is normal; weight, 180 grams. The left kidney is congested, calices dilated, and one or two have undergone amyloid degeneration; weight, 190 grams. The right kidney shows the calices to be dilated; weight, 180 grams. The remainder of the genito-urinary organs are normal. The liver is smaller and paler than normal; weight, 550 grams. The walls of the gall bladder are thickened. The remainder of the organs of the digestive tract are normal.

R. R. H.
W. M. J.
J. M. G.

CASE 20.

Aortic and mitral—Bright's disease, granular kidney.

M. B.; aged 66 years; nativity, Ireland; admitted to the United States Marine Hospital, Boston, Mass., March 7, 1898; died April 29, 1898, at 5.45 p. m.

History.—When admitted to the hospital patient stated that he had been a free drinker all his life. For some time past he had been failing in strength and suffered with dyspnoea. For three weeks his lower limbs had been swollen, and there had been some suppression of urine. Inspection showed that his lower extremities were very oedematous, pitting deeply on pressure. Physical examination of the heart revealed a murmur at the mitral area and also at the aortic. The former was systolic, the latter diastolic, in time. His urine was measured and amounted to about 500 c. c. in the twenty-four hours. On microscopical

examination epithelial casts, compound granules, and bacteria of decomposition were found. Under treatment urinary secretion increased in amount and the œdema improved, but the heart action gradually grew worse. On the afternoon of April 29, while the nurse was absent from the ward, patient got out of bed to use the commode. While up he became exhausted, face became cyanosed, and he had just been gotten into bed when he died.

Necropsy (fifteen hours after death).—General nourishment good; rigor mortis and post-mortem lividity marked; pupils medium; jugular veins distended and prominent; face cyanosed. The heart weighed 685 grams, and was much enlarged and "beefy." The coronary arteries were prominent and very atheromatous. Its pericardial sac contained 50 c. c. of fluid. The pulmonary and tricuspid valves were competent; aortic and mitral valves were incompetent, their segments thickened and containing cartilaginous plates. The left ventricle was greatly hypertrophied, its wall being more than twice as thick as normal. The left lung weighed 490 grams. The right lung weighed 575 grams. Both lungs were deeply pigmented and passively congested to a marked degree, and the right lung was slightly œdematous. Both pleural cavities were filled with fluid, and the left was obliterated posteriorly by firm bands of adhesion, fibrous in character. The peritoneal cavity was distended and filled with fluid. The gastro-intestinal tract was normal throughout. The liver weighed 1,655 grams. On section it showed excessive development of connective tissue, giving it a nutmeg appearance. The gall bladder contained 20 c. c. of bile. The pancreas weighed 125 grams, and was normal. The left kidney weighed 215 grams. The right kidney weighed 190 grams. Both organs were deeply congested and gave evidence of hypertrophic cirrhosis. The urinary bladder, urethra, and prostate were normal. The suprarenal bodies together weighed 16 grams. The spleen weighed 330 grams. It was soft and friable, and was passively congested. The brain weighed 1,420 grams, and was apparently normal. Its membranes were much thickened and were congested.

F. W. U.

H. W. W.

CASE 21.

Aortic and mitral.

C. J., aged 36 years; nativity, Denmark; admitted to the United States Marine Hospital, New Orleans, La., January 27, 1898; died June 16, 1898.

History.—Patient says that he had had "slight fevers," and first noticed shortness of breath after he recovered from an attack of fever. Legs have been swollen for the past twelve days. Face pallid; well nourished; has dyspnoea, swelling and œdema of legs. Physical examination showed a mitral regurgitant murmur, and an aortic regurgitant murmur. He obtained some relief from digitalis for a short time. Patient gradually developed some gastric symptoms, then cough, dyspnoea, hæmoptysis, sleeplessness, renal symptoms, pain over cardia, palpitation, irregularity of the pulse, and an ascending anasarca of both feet, legs, and abdomen. Physical signs of hypertrophy, and then dilatation. Murmurs of heart continued and became louder and more distinct. Systolic and diastolic murmur over aortic area, indicating a stenosis, and a mitral regurgitant murmur, which was transmitted so as to be heard over whole chest and posteriorly. Pulse was full, hard tension; the pulse wave would be followed by a sudden fall in fullness. Other physical signs were those of œdema of lungs and hydrothorax. There was an occasional remission of the symptoms from use of stimulants, sedatives, diuretics, and cathartics. He was placed on milk diet and special diet, had frequent steam baths, and rest in bed; occasional dose of morphine.

Necropsy (twelve and one-half hours after death).—Rigor mortis complete. Livores over whole of back and lower extremities and over dependent portions of body. Œdema of extremities, abdomen, penis, and scrotum. Abdomen swollen,

due to ascites. Interspaces of lower ribs prominent, due to pressure of pleural exudation. Skin over legs and thighs excoriated. Pericardium large, and contains about 200 c. c. of serous fluid. Apex of heart at level of lower border of seventh rib and in nipple line. Heart weighs 800 grams, very much enlarged; its apex is rounded and knob-like; the right auricle is distended and extends to right side; the whole heart is hypertrophied; the right ventricular wall is 1.25 cm. thick at its center, tapering down to 6 cm. in thickness at the apex; the ventricle contains some soft black clots; the tricuspid orifice will admit the tips of five fingers; its valves are small and insufficient, producing a relative incompetency; the right auricle contains some soft and firm black clots; its cavity is enlarged; its walls are 5 mm. thick. Left ventricle: Its walls are three-fourths of an inch thick throughout; the cavity is dilated; the mitral opening will admit four fingers; its valves are small, and present a relative insufficiency for the opening; the left auricle is dilated; its walls are 5 mm. thick. The semilunar valves of the pulmonary artery are apparently normal; the aortic orifice will admit two fingers; the valves are very thick and short, and present over the aortic surface some calcareous deposits; some thick adhesions exist between the edges of the valve flaps; the ascending portion of the aorta is dilated and fusiform in shape; the walls are thick, and the inner surface presents some ulcerations, round in shape, and some irregularities over its whole surface, due to beginning calcareous or fibroid degeneration. The thoracic aorta is thickened and stiff, probably due to sclerotic changes. Both pleural cavities contain considerable sero-sanguineous fluid. Lungs are partially collapsed, and some pleural adhesions occur posteriorly and on the side. Right lung weighs 694 grams; surface smooth, dark in color; upper lobes crepitate normally; lower lobe feels like a solidified mass. On section: Upper lobe is dark in color, frothy fluid squeezed out; middle lobe same; the lower lobe presents a black solidified mass of undoubted hemorrhagic origin, probably an infarct. Left lung weighs 330 grams; surface is bluish gray; crepitates normally; a few adhesive bands over surface. On section is dark in appearance, frothy, bloody fluid squeezed out of subsurface. Abdomen distended with fluid. On section a great quantity of pale serous fluid removed. Intestines are apparently normal. Peritoneum is smooth and free from any adhesions. Liver small; surface is pale; presents some irregular flattened projections; is resistant and hard to the feel; weight, 1,670 grams. On section the tissue seems resistant to the knife, probably cirrhotic; little dark blood oozes from the cut surface. The gall bladder is distended; gall ducts are patulous. Spleen weighs 220 grams; is small and triangular in shape; feels hard; surface smooth, and is dark red. On section: Pancreas weighs 75 grams; position and appearance apparently normal. Kidneys: Right kidney contracted, pale in appearance; its capsule is partly adherent. On section: Cortical portion is about one-fourth inch thick; medullary portion is about one-fourth inch thick, contracted; weight, 175 grams. Left kidney weighs 170 grams; is pale; capsule nonadherent. This kidney is lobulated into four segments. On section is dark red. Right suprarenal capsule is dark yellowish-brown, apparently normal. Ureters normal. Bladder is small; contains small amount of urine. Testicles soft; tunica vaginalis contains some serous fluid. Skin over scrotum is very much thickened. Brain weighs 1,440 grams. Ventricles somewhat dilated; contains fluid.

CASE 22.

Aortic and mitral.

J. C., aged 41 years; nativity, Maine; admitted to the United States Marine Hospital, New York, N. Y., August 27; discharged November 3, 1897; readmitted to hospital January 3; died March 30, 1898.

History.—Family history good. Alcoholic; denies rheumatism. Three or four weeks before first admission, began having swelling of feet and legs, fullness of

abdomen, pains in chest and dyspnoea, which was marked on lying down. Examination showed marked hypertrophy of heart; systolic murmur at apex, transmitted in all directions; also thrill, diastolic aortic murmur transmitted to all larger vessels; lungs normal. Urine contained some albumen. Was discharged improved, but returned January 3, 1898, with all symptoms marked, especially dyspnoea, which became extreme on slight exertion. In spite of treatment, patient steadily became worse; cedema of legs, insomnia, headache, nausea, and vomiting were added to other symptoms during the last month. Finally, after a week of great distress, with periods of restless stupor, patient died.

Necropsy (fourteen hours after death).—No external signs of violence. Body fairly well nourished; rigor mortis marked; legs and thighs swollen and cedematous. Calvarium not removed. Thoracic cavity: Pericardium contained small amount of fluid. Heart of enormous size, displacing left lung upward and backward, of dark red color; aortic orifice somewhat enlarged; valves thickened and incompetent; pulmonary valves slightly incompetent. Left auricular ventricular orifice about 8 cm. in diameter; one valve was shortened and thickened, the other very thin, long and bound obliquely across the orifice. The latter evidently has been doing nearly all the valvular work. Right auriculo-ventricular orifice measures 6.5 cm.; the valves are fairly competent; on section wall of left ventricle is much thickened, being 2.5 cm. in thickness. Left ventricle holds 225 c. c. of fluid. Wall of right ventricle is 1.2 cm. thick. Heart, free of clots, weighed 1,050 grams. Lungs: Left lung much congested and shows some cedema; weight, 570 grams. Right pleural cavity contained about 1,200 c. c. of clear fluid; upper lobe of right lung congested; lower and middle lobes solidified, and of almost black color. They sink in water and on section are gelatinous, resembling clotted blood; weight, 850 grams. Microscopic examination of consolidated area shows increased thickness of alveolar walls, dilatation of alveolar capillaries, many red blood corpuscles filling the alveoli. The alveolar walls and spaces are infiltrated with granules of brown pigment; condition of "brown induration." Abdominal cavity contained about 2,000 c. c. of clear fluid. Stomach dilated and flabby; it contained small amount of chyme. Mucous membranes pale, with ecchymotic spots. Intestines apparently normal. Appendix normal. Liver was slightly enlarged; surface was smooth, mottled red and blue color. On section it was tough and of a granular mottled yellow appearance; weight, 2,260 grams. Microscopical: Some increase of connective tissue stroma; some dilatation of capillaries at center of lobules. Cells at periphery of lobules are infiltrated with fat. Gall bladder was normal. Spleen was small and hard; weight, 160 grams. Kidneys: Right, large, blue color; capsule nonadherent; much fat surrounding and in pelvis. On section, substance is succulent and soft, dark red in color; markings very distinct; weight, 620 grams. Left, small, not over one quarter size of right; blue, succulent; weight, 170 grams. Microscopic section shows condition of chronic congestion. Tubule cells are swollen and often broken down. Glomeruli are swollen and obscure. Capillaries are filled with corpuscles. Artery walls are thickened. Suprarenal capsules apparently normal. Ureters and bladder thickened. Pancreas apparently normal; weight, 70 grams.

S. B. G.

G. W. S.

CASE 23.

Fatty degeneration of heart with rupture.

J. C.; aged, 37; nativity, Nova Scotia; was admitted to the United States Marine Hospital, Boston, Mass., October 22, and died October 29, 1897.

History.—On the day of admission, while hauling in the anchor, patient caught his left foot in the chain and fell. He sustained a fracture of the tibia, oblique

in direction, and just above the lower extremity of the bone. He gave a history of perfect good health previous to the injury. On the evening of October 29, while using the bedpan, he became very much exhausted, dyspnœa set in, and the heart became very weak. In a half hour he died.

*Necropsy (fourteen hours after death).—*Post-mortem lividity extreme; rigor mortis marked. Pupils medium. Jugular veins distended and prominent. The heart weighed 460 grams. The right heart showed marked fatty degeneration, and the right auricular wall was much thinner than normal. In the anterior wall of the right auricle, near the auriculo-ventricular septum, and just external to the appendix auriculæ, was a perforation the size of a goose quill, and somewhat irregular in shape. The heart muscle was very soft and friable. All the valves were competent, the aortic valves somewhat thickened. The pericardial sac was filled with fluid venous blood. The left lung weighed 620 grams. The right lung weighed 780 grams. Both lungs were of a dark-reddish slate color, and on section showed marked venous congestion, and were filled with bloody froth. The pleuræ were normal. The stomach was distended, and was slightly congested. The intestines were somewhat congested. The liver weighed 1,700 grams. It was dark in color, and on section showed a slight increase of the connective tissue, giving it a nutmeg appearance, and there was also some congestion. The gall bladder contained 15 c. c. of bile and was normal. The pancreas weighed 110 grams and showed no pathological changes. The left kidney weighed 200 grams. The capsule stripped readily: on section, there was slight congestion. The left renal artery divided into two branches—one entering the hilum normally between the ureter and vein; the other branch entered the inner border of the kidney above the hilum and near the apex. The right kidney weighed 198 grams. Its capsule stripped with ease: on section, some congestion was found. The urinary bladder contained 200 c. c. of urine, and its mucosa was markedly congested. The urethra and prostate were normal. The suprarenal bodies showed post-mortem softening. The spleen weighed 230 grams and was somewhat congested. The membranes of the brain weighed 1,370 grams. All its vessels were much congested, and the lateral ventricles contained each about 5 c. c. of bloody serum.

H. W. W.

CASE 24.

Pericarditis, suppurative.

C. L.: aged, 50 years; nativity, Germany; was admitted to the United States Marine Hospital, port of San Francisco, Cal., January 18, 1898, and died February 3, 1898.

History.—Patient, while on a prolonged alcoholic debauch, contracted a cold, which steadily grew worse. He coughed considerably, especially at night, and for several days prior to his admittance to the hospital had a pain in his right side. Physical examination showed that the chest was well formed; movements were equal on both sides, while vocal fremitus was increased on the right side. Upon percussion, no definite dullness was discovered, although there was a slight impairment of resonance over the lower lobe of the left lung. Over the entire lung area the respiratory murmur was harsh and prolonged upon inspiration, while numerous sibilant and sonorous rales were present. Heart, normal; liver, slightly enlarged in its vertical diameter. On the 25th of January the patient complained of shortness of breath, and upon percussion the area of cardiac dullness was shown to be increased in all directions, and the heart sounds were muffled. A blister was applied over the area of dullness and two large blebs resulted. The patient continued to be dyspnœic, and on February 1 it was noticed that his legs were swollen. On the 2d, paracentesis of the pericardium

was performed and about 30 c. c. of pus withdrawn. Microscopic examination showed the diplococcus pneumoniae of Fränkel to be present. Strychnia and digitalis were freely given, but the dyspnoea increased, and patient died February 3, 1898, at 9.45 p. m. From the 18th to the 25th of January the patient had a temperature which varied from normal to 38.5° C., but after the 25th the temperature was normal.

Necropsy (sixteen hours after death).—The body is that of a well-developed, well-nourished adult, white male. Rigor mortis well marked. Encephalon normal. Weight of brain 1,250 grams. The pericardial sac contains 300 c. c. of creamy pus. The visceral and parietal layers of the pericardium are thickened and infiltrated with fibrin, serum, and pus, while at the apex there are strong, fibrous adhesions uniting both layers. On section, the peripheral layers of the cardiac muscle are infiltrated with pus for a depth of 3 mm., while the remainder of the muscle is anæmic. The cavities and valves are normal. Weight of heart, 510 grams. The aorta is atheromatous. The pleuræ, at the bases of the right and left lungs, show a few fibrinous adhesions, elsewhere the parietal and visceral layers of both pleuræ are normal. The lower lobe of the left lung is congested, otherwise it is normal. Weight, 650 grams. In the most dependent part of the lower lobe of the right lung is a cavity 3 cm. in diameter, while the remainder of the lung shows areas of consolidation from 1 to 4 cm. in diameter. Weight, 900 grams. The peritoneal cavity is normal. Spleen, normal; weight, 250 grams. In the left kidney is seen an increased amount of fat; weight, 270 grams. The right shows evidence of fatty degeneration; weight, 290 grams. The remainder of the genito-urinary organs are normal. The liver is congested; weight, 1,900 grams. The remainder of the gastro-intestinal tract is normal. The spinal cord was not examined.

R. R. H.

W. M. J.

J. M. G.

Microscopical report.—Sections made from the lung show scattered areas where the following changes have taken place in the air spaces and smaller bronchi: The walls of the bronchi are thickened and show a proliferation of the fixed connective tissue cells and an increase of fibrous tissue; the peribronchitic zones show a similar development of new tissue; the air spaces communicating with and near the diseased bronchi show similar changes in their walls; and both bronchi and air spaces are filled with an exudate which is well organized and shows little or no tendency to break down. The condition of the lung, therefore, confirms the diagnosis of broncho-pneumonia.

H. L. M.

R. R. H.

ANEURISM.

CASE 1.

Arch of aorta.

P. A.; aged 56; nativity, New Hampshire; admitted to the United States Marine Hospital, Mobile, Ala., December 11, 1896, having been transferred from Jacksonville, Fla.; died March 28, 1898.

History.—Suffered no disease until three years ago, when his strength gave way. Then had cough and frequent attacks of dyspnoea, with progressive weakness. Cough increased until he could not do duty. The attacks of dyspnoea became more frequent. The roaring of the aneurism prevented sound sleeping when he lay on the left side. Impulse to subclavian artery simulated an aneurism of that vessel.

*Necropsy (six hours after death).—*Present: Hospital staff and P. A. Surg. A. C. Smith. Rigor mortis, not complete. Post-mortem lividity, left side of face and posterior third of body. General nourishment, poor. Pupils partially dilated. Pericardial sac contained about 200 c. c. of pale fluid; no adhesions to heart. Heart: Weight (after opening), 700 grams; wall of left ventricle about 20 mm. in thickness, of right ventricle about 12 mm.; endocardium and valves normal. Aorta: Seat of a fusiform aneurism, involving the ascending and transverse portions of the arch; interior of arch showed calcified plates, very firm and partially detached; diameter of center of aneurism about 5 cm. Thoracic and abdominal aorta and other vessels normal, not calcified. Lungs: Both lungs compressed by the fluid in pericardial sac and in the pleural sacs; lungs deeply congested; anterior edge of right lung showed a cicatrix; right pleural cavity contained about 800 c. c. of a dark-colored fluid; masses of loose flocculent lymph, floating free; quite a number of very strong adhesions; left cavity contained about 900 c. c. of a pale-yellow liquid; no adhesions. Liver: Capsule very adherent; edges rounded; tissue firm; in color, dark purple, mottled with gray; weight, about 1,400 grams. Gall bladder much distended. Kidneys: Left, weight 140 grams; shrunken; dark; tissue firm; capsule nonadherent. Right, weight 135 grams; shrunken; more purple than left; capsule nonadherent. Spleen: Weight, 300 grams, congested; large cicatrix in capsule near lower end; dark purple; firm. Left clavicle broader than right, apparently flattened, and of dark color on under side of center. Head: Scalp not congested; membranes pale; small amount of fluid. Weight of brain, 1,450 grams; brain substance firm; anæmic; cuts easily; apparently nothing abnormal. Opinion as to cause of death: Death was probably due to a "splinting" of the heart, caused by the effusion in the pleural and pericardial sacs, and to a loss of lung space by compression of the lungs from same cause.

J. F. A.

R. D. M.

CASE 2.

Arch of aorta.

J. B.; aged 38; nativity, Sweden; admitted to United States Marine Hospital, Chicago, Ill., May 26, 1897; died May 27, 1898.

History.—The patient came to hospital complaining of severe pains in chest, neck, and back, a poor appetite, and insomnia. In 1893, four years previous to his entrance to hospital, the patient noticed slight pains in thoracic region. For eighteen months these pains became more severe, but his condition improved after that time until May, 1897, when he again entered the hospital and remained for one month, and left feeling somewhat better. He returned, however, October 21, 1897, and was found to be suffering from an aneurism of the arch of aorta. The patient's condition remained about the same until March 22, 1898, when he was discharged at his own request against advice. During his absence the patient grew worse, and was readmitted April 5, 1898, in a serious condition. The patient was then suffering great pain in head and neck, lips were blue, voice husky, and he breathed with difficulty. Heart was rapid and contractions very weak. Temperature, 38.6 C.; pulse, 90. The patient could only sleep in a sitting posture, with his head between his knees. His condition grew steadily worse, and he became delirious at times, which continued to the end. The treatment consisted of bromides, morphia, iodide of potash, and finally cardiac stimulants, under which he improved slightly.

*Necropsy (eighteen hours after death).—*Post-mortem rigidity marked. Brain weighed 1,550 grams. Punctiform congestion in tissues. Sinuses were normal. The vessels were congested. Membranes were adherent and congested. Anterior

mediastrium and thymus gland were apparently normal. Pericardium contained no fluid. The heart weighed 300 grams, and was contracted. The wall of the left ventricle was thin, the right much thickened. The bodies of the six cervical vertebrae, and also the first, second, third, and fourth dorsal were found to be eroded, due to pressure of the aneurismal sac. Pluræ were strongly adherent. Left lung weighed 400 grams and was pale around aneurism. Right lung weighed 1,100 grams and was congested. Great vessels: Arch of aorta had a large dilatation containing large clots of blood nonlaminated. Cavity would contain about 100 c. c. Walls of artery thickened. Nerve trunks were normal; diaphragm was normal. Omentum was thin; otherwise normal. The spleen weighed 200 grams; capsule adherent, tough on section, and congested. Kidneys: The right weighed 170 grams; capsule adherent; cortex normal. The pelvis contained a great deal of fat. Left kidney weighed 250 grams; pelvis contained more fat than right; capsule strongly adherent; suprarenal capsules were normal. The bladder contained about 150 c. c. of dark urine; walls were thickened. Organs of generation were normal. Rectum was normal and contained but little fecal matter. The duodenum was small in caliber. The stomach was small and congested. Gall ducts patulous. Liver weighed 1,460 grams; capsule was strongly adherent and thickened; otherwise normal. Gall bladder contained about 100 c. c. of bile. Pancreas was normal. Solar plexus apparently normal; mesentery was normal. Small intestines were small in caliber; large intestines contained numerous scybala of feces. The great vessels were normal.

H. C. R.

H. W. S.

CASE 3.

Fusiform, transverse aorta—Valvular disease, heart aortic, and mitral regurgitation.

A. T.; aged 55 years; nativity, Spain: was admitted to the United States Marine Hospital, port of San Francisco, Cal., July 19, 1894, and died March 1, 1898.

History.—Patient was treated for twenty-six days for aneurism of the aorta and aortic incompetency and stenosis. He was discharged at his own request August 6, 1894. He was again admitted for relief of the same complaint August 17, 1894. Physical examination: On inspection of the chest a pulsating area was seen between the second and third ribs to the right of the sternum. The apex beat was seen to be displaced outward, being situated 3 cm. to the left of the mammary line. On percussion no dullness of the lungs was discovered except a small area situated in the middorsal region to the right of the spinous processes of the vertebrae. The heart area was enlarged downward and to the left. On auscultation a bruit both systolic and diastolic in time was heard over the pulsating area, being transmitted downward to the xiphoid appendix. Systolic and diastolic murmurs were heard over the aortic orifice, and over the mitral valve a systolic murmur was heard. The liver and spleen were apparently normal. He was given a systematic course of treatment with potassium iodide, and was confined to bed for some time. He was also put on a diet rich in albuminoids, but with as little liquids as possible. Under this treatment his symptoms were so much ameliorated that at his own request he was discharged improved December 12, 1894. He again sought treatment May 5, 1895, for the same complaint. He was given practically the same treatment as during his previous stay in the hospital. Physical examination at this time revealed no change in his condition. Physical examination: The cardiac area of dullness was enlarged downward and to the left, the apex beat being situated at 4.5 cm. to the left of the mammary line and 5 cm. below the nipple. On auscultation the bruit was heard both on systole and diastole, and

over the aortic valve systolic and diastolic murmurs were heard. There was also a mitral systolic murmur present. At this time the pulsating area noted in the previous physical examination was not found. He remained in fair condition until January, 1898, when it became evident that failure of compensation threatened. At this time physical examination showed that both the bruit and the pulsating area noted in the examination of August 17, 1894, had disappeared. Under stimulation his heart reacted well for a while, but the improvement was temporary, the heart muscle gradually growing weaker until his death.

Necropsy.—The body is that of a well-developed, well-nourished, adult white male. Rigor mortis is well marked. The encephalon is normal; weight of brain 147 grams. The pericardium is normal. The heart is enormously hypertrophied; weight, 750 grams. On section the aortic orifice is seen to be dilated and the cusps of the valves thickened and distorted. The mitral orifice is dilated, but the leaflets of the valves are normal. Occupying the entire ascending and transverse portions of the arch of the aorta an aneurism 12 cm. in diameter is seen. On section of the aneurism a well-organized clot is seen adhering to the walls; the thickness of the clot varies from 1 to 2 cm. There is 600 c. c. of clear serous fluid present in the right pleural cavity; the pleuræ on the right side are otherwise normal. The parietal and visceral layers of the pleuræ on the left side of the chest are strongly adherent at the base of the lung. The right lung is normal, except for a well-marked degree of passive congestion; weight, 1,050 grams. The left lung is slightly collapsed, but is otherwise normal; weight, 450 grams. The spleen is normal; weight, 170 grams. The right kidney is normal; weight, 160 grams. The left kidney is normal; weight, 180 grams. The genito-urinary tract is normal. The liver presents on section a marked degree of fatty degeneration; weight, 1,800 grams. The digestive tract is normal. The spinal cord was not examined.

H. S. M.

S. W.

J. M. G.

CASE 4.

Thoracic aorta.

P. D.; aged 51 years; nativity, Ireland; admitted to the United States Marine Hospital, Cairo, Ill., June 28, 1897; died December 12, 1897.

History.—Under treatment for rheumatism since March 6, 1897, as an office patient.

July 27, 1897.—Troublesome cough and expectoration. Has had night sweats and dyspnoea. Some dullness on percussion over apices. Voice hoarse; breath sounds bronchial in character. Heart: Apex beat 2 inches outside nipple and two spaces below; no murmur, but sounds indistinct. Pulse intermits every few beats and of little strength. Patient's weight, 143 pounds.

December 7, 1897.—Expectoration slight; the cough and dyspnoea due to passive congestion of lungs from cardiac trouble. Skin pale; veins distended; pulse frequent and lacking force. Has little or no appetite. Pain in shoulders very troublesome, but phenacetine at night gives some relief. Urine has been examined lately, but shows no trace of albumen.

December 9, 1897.—Apex beat 13 cm. outside nipple and a little downward when patient is lying on back. Apparently separate pulsation over upper part of thorax. This, with the pain felt in back and shoulders, indicative of aneurism, and from the location of greatest intensity of pulsation probably the arch of aorta affected. The radial pulses show a difference in strength; the left weaker

and more compressible. No aneurismal bruit can be heard either in front or posteriorly.

December 12, 1897.—Had two bad hemorrhages during the night; blood came up without effort, attended by both coughing and vomiting. He is weak and pale in consequence. Pulse can scarcely be felt at the wrist, and the face is covered with perspiration. Died at 6 p.m. from sudden heart failure.

Necropsy (sixteen hours after death).—Body poorly nourished; skin pale; rigor mortis well marked. Mottling of skin general over posterior surface of body. Dark-colored fluid exuding from the mouth and nose. Superficial veins generally distended. At lower part of the abdomen, chiefly in the iliac regions, the abdominal wall was dark colored and distended. Brain: Dura mater quite opaque and adhered to skull cap at several points. The subdural space contained a considerable quantity of fluid, but not enough to distend the dura at all points. The fluid—straw colored—escaped freely on opening the membrane. The dura mater was adhered to the membrane beneath it along the margins of the longitudinal sinus. The vessels on the convexity of the brain were distended with blood, including the vessels of the sulci. The brain was of firm consistence. The superior longitudinal and lateral sinuses contained thin fibrinous clots. Brain tissue on section appeared normal. Upon opening the thorax an aneurism of the arch of the aorta was found occupying the space between the heart and the lower border of the thyroid gland longitudinally, about 17 cm. in diameter laterally, and nearly the same antero-posteriorly. The tumor was attached to the posterior surface of the sternum over a small area, and the bone was slightly corroded at the point of attachment. The aneurism was nearly spherical in shape and contained a clot, laminated and firm in most parts, but soft and friable posteriorly, where it had, by pressure, made an opening in the anterior wall of the cesophagus. This had given rise to the fatal hemorrhages and the coffee-ground material found all through the intestines. The pericardial sac contained about 75 c. c. of serum. The heart weighed 380 grams. The cavities were dilated; mitral and aortic valves slightly thickened. The walls of the heart were of firm consistence and pale in color. The ascending aorta was dilated, and its inner surface was rough and fibrinous. The aneurismal dilatation began 5 cm. above the valvular orifice. The right lung was somewhat compressed laterally, and its upper lobe was congested. The remainder of the lung was somewhat œdematous. The entire lung was permeable to air. The left lung was much more compressed than the right, but was otherwise in similar condition. The diaphragm was very thin. Spleen: Capsule much thickened and attached to the intestines and abdominal wall by firm adhesions. The cut surface was of light-red color and of very firm consistence. There was apparently a considerable increase in connective tissue. The organ contained comparatively little blood and was somewhat enlarged. The intestines were distended with gas and of a dark-blue color on account of containing throughout their greater portion a quantity of "coffee-ground" blood from the aneurism. The intestinal blood vessels were injected in many places; otherwise the tissue was normal. The liver weighed 2,500 grams. Its surface presented a nutmeg appearance and, over a considerable area, a rough granular and contracted condition. This, however, was not general. The cut surface, of reddish-brown color and easily torn. The kidneys had considerable fat around them. The left was much larger than the right. On the outer border of the left a part of the surface was rough and irregular from cirrhosis. The cut surface showed an almost complete destruction of the cortical portion of the kidney, the medullary structure being increased in volume. This was more marked in the left. The pancreas and other tissue not included above were of normal appearance.

CASE 5.

Aneurism thoracic aorta.

L. G.; aged 54 years; nativity, Germany; was admitted to the United States Marine Hospital, Port Townsend, Wash., March 4, 1898; died April 18, 1898.

History.—The patient was under treatment in this hospital from January to May, 1897, for rheumatism, his constant complaint being pain in the back. He was later treated at the office for pain in the right lumbar region, and was again admitted to the hospital on December 28, 1897, for abscess of the connective tissue of the leg, which soon healed, but he remained under treatment for rheumatism until February 14, 1898, when he was discharged, as the pain in the back was not very severe and repeated examinations of the urine were negative. The patient came to the hospital again seven days later, stating that he had suffered severely from pain in his back since his discharge. He was admitted, and upon careful examination a pronounced pulsation of the abdominal aorta was detected, and by moderate pressure the vessel was felt to be of larger caliber than normal. Auscultation revealed a marked systolic murmur at the apex of the heart, which was very little audible in the axilla but quite noticeable in the tricuspid area. The apex beat when the patient was lying on his back was on a level with the fourth rib and quite near the left nipple. He was ordered to remain in bed and placed on light diet. Although an aneurism was suspected at this time, it was only after all the symptoms and signs had been studied for several days and their true diagnostic value estimated that it was considered justifiable to make the diagnosis of aneurism of the lower portion of the thoracic aorta. He suffered with considerable pain in the back, which at times radiated to the groin; at first this was most severe on the left side, but later became most pronounced on the right side near the spinal column. The pain was described as constant and gnawing in character, with occasional acute exacerbations of sufficient severity to necessitate morphine hypodermatically. The patient chose a special position for greater ease, and was always found lying on the back, turned a little to the right; he said that when he changed to his left side the pain became more severe. The condition of the patient remained about the same, although pulsation in the epigastric region was not so marked. The action of the heart was regular and the pulse of good volume. On the morning of April 18 he was seized suddenly with a sharp and severe pain in the chest and died in a few seconds, evidently from rupture of the aneurism.

Necropsy (ten hours after death).—The body was of a pale waxy color; rigor mortis slight. Thoracic cavity: The pericardium was normal, and the heart presented no pathological changes, except a slight thickening of the mitral and aortic valves. The aorta was of a much larger caliber than normal, the arch being 6 cm. in diameter; the thoracic aorta was also dilated and was 5 cm. wide until the ninth dorsal vertebra was reached, at which site the aneurismal sac commenced and extended to the lower border of the twelfth dorsal vertebra. The aneurism was 10 cm. in diameter and had ruptured into the right pleural cavity, which was completely distended with semicoagulated blood. The bodies of the ninth, tenth, and eleventh dorsal vertebræ had been much eroded by the pressure of the aneurism, so much so, in fact, that the spinal canal was almost opened by the process. The intervertebral fibro-cartilage had been spared, and the disks were normal in size. An attempt had been made by nature to cure the aneurism by the deposit of layers of fibrin, and the cavity of the sac had become obliterated to one-half of its original size. The abdominal aorta was also dilated, and upon examining the intima of the aorta it was found studded with numerous atheromatous areas. The lungs and pleuræ were normal. Abdominal cavity: All the vias in this cavity were macroscopically normal.

CASE 6.

Saccular, descending part of arch of aorta—Ruptured.

C. L.: aged 31 years; nativity, Germany; admitted to United States Marine Hospital, Stapleton, N. Y., August 5, 1897; died October 11, 1897.

History.—Rheumatism three years ago; ulcer of penis four and one-half years ago; fractured a rib twenty years ago; serious illness early in life, nature unknown to him. For about two months has suffered with pain in epigastrium, and recently with severe pains all over abdomen. Extremely constipated, although he has been taking purgatives. Urine rather dark and scanty. Tongue and mouth has been coated and ulcerated, but fairly clean now. Gums dark. On inquiry found he has been doing painting aboard ship for some time. Patient given sulphate of magnesia till bowels acted freely. A note made on morning after admission says nothing found in physical examination except blue line around gums. Urinalysis showed normal urine—clear, no sediment, acid, 1.017, no albumen. Patient was treated for lead poisoning with magnesium sulphate and iodide of potash, and in a few days his constipation and abdominal cramps disappeared. Soon after his admission he began to complain of slight pains in chest, and finally, on August 9, he said that this had grown so severe that he could not lie down with comfort. His chest was again examined, and there was heard a systolic cardiac murmur, loudest at second right interspace, but also heard at apex, and transmitted to vessels of left side of neck. No enlargement of heart. He had also a dry cough, but nothing was found on examination in his lungs. No tender spots over chest. Despite symptomatic treatment the pain not only continued, but grew worse, particularly at night. Finally, the pain became localized to left side of chest, radiating to back, under left scapula. Pain dull and aching, always present, worse at night. Bromides, chloral, and nitroglycerin were all tried, with little effect. He slept little and began to lose in weight. Repeated examinations were made and following noted: Systolic blow over precordium heard on both sides of sternum and just above apex; also heard in left upper back. Lungs clear. No difference in radial pulses, or pupils, or hands—in fact, two sides of body just alike. Dry cough, with some little difficulty in breathing. Pain in chest, left side, worse at night. Once or twice there was a little fever for three or four days at a time. On September 27, early in the morning, he had a sharp asthmatic attack lasting several minutes, and both lungs on auscultation were found full of high and low pitched dry râles. From this time on his condition grew rapidly worse. The asthmatic attacks were repeated and very severe, although relieved rapidly by morphine, which was given freely. On October 5 he was again examined carefully and the following noted: Asthmatic attacks severe and becoming more frequent. Countenance pale and anxious. Losing in weight. Pain continues over left breast, radiating to back under left scapula. No difference in pulses or pupils on two sides. Systolic cardiac blow still present, and now heard with greatest distinctness about 4 cm. above nipple and well within mammary line and in interscapular region of left side. No pulsation anywhere over chest (except apex beat), but slight dullness in left interscapular region. Tracheal tugging tried several times and thought to have been observed. On October 8 patient had such a severe asthmatic attack that after trying various drugs a vein was opened in his arm and about 150 or 200 c. c. of blood withdrawn, which gave relief. On the morning and afternoon sick calls of October 10 he showed little change. In the early morning, on October 11, patient dropped into a collapse; respiration shallow and frequent; no pulse at wrists and unconscious. Death occurred at 4.20 a. m. October 11, 1897.

Necropsy (seven hours after death).—Body of a white man; black hair and mustache; light eyes; 5 feet, 8 inches high; weight, about 140 pounds; well developed and fairly well nourished. Rigor mortis beginning (marked in neck).

Livid over back. Calvarium removed and the brain and its membrane and cranial cavity found normal in all respects. Thorax: Left side of thorax half filled with fluid blood and clots; the right side also contained a small quantity. The pericardium contained about 50 c. c. of clear amber fluid. The heart itself (weight 320 grams) appeared normal in all respects except slight hypertrophy of walls of left ventricle; all valves normal. The walls of aorta at base of heart somewhat thickened. Pleural adhesions on the right side; the lungs were congested at their bases behind. The heart, pericardial sac, and lungs having been removed exposed a large clot of blood entangled in the connective tissue surrounding the large blood vessels, lying on the vertebral column. The aorta was then removed and on examination a fairly large saccular aneurism of the descending portion of the arch was discovered which had ruptured into the left side of the chest. The aneurism contained no clot of any kind. On the vertebral column opposite fourth dorsal vertebra there was a depression corresponding to position of aneurism, but the bone had not been laid bare. Abdomen: Peritoneal cavity contained a small quantity of fluid. The bladder contained a quantity of clear urine. The liver was enlarged. Other abdominal organs normal.

C. H. L.

G. W. S.

CASE 6.

Saccular, descending aorta—Hemorrhage.

G. F.; aged 45 years; nativity, Florida; was admitted to the United States Marine Hospital, port of San Francisco, Cal., January 19, 1898, and died January 28, 1898.

History.—Patient complained of pain in the stomach, accompanied with nausea and anorexia. These symptoms had been present for a year, and during that time they had gradually increased in severity. Dysphagia developed later. Patient had lost 30 pounds weight. Physical examination showed that the chest and lungs were normal. Heart area was slightly increased to the left. A systolic murmur, soft in character, was heard at the aortic opening. Pulse was of high tension and irregular. Tongue was red and coated. Liver and spleen were normal. On the 20th of January complained that the dysphagia was more pronounced, but upon external examination there was no evidence of any growth in the neck. On the 22d an esophageal bougie was introduced, and a stricture located in the esophagus 25 cm. from the incisor teeth. At 7 p. m. January 28 patient had a severe hemorrhage in which about 2 liters of blood were lost, and although heroic stimulation with intermuscular injections of normal salt solution were resorted to, he died at 7.30 p. m. January 28, 1898.

Necropsy (sixteen hours after death).—The body is that of a well-developed, well-nourished adult mulatto male. Rigor mortis well marked; encephalon normal. Weight of brain, 1,380 grams; the pericardium is normal. Heart normal; weight, 290 grams. Situated in the descending portion of the arch of the aorta is an aneurismal sac 5 cm. in diameter, which contains an organized blood clot. The sac communicates with the esophagus through an opening 1 cm. in diameter. The sixth, seventh, and eighth dorsal vertebrae are eroded; the intervertebral disks are intact. A few slight adhesions are seen over the apex of the right lung, otherwise the parietal and visceral layers of both pleurae are normal. Lungs are normal; weight of right, 370 grams; left, 350 grams. The peritoneal cavity is normal. The spleen is normal; weight, 90 grams. Kidneys normal; weight of right, 150 grams; left, 160 grams. The remainder of the genito-urinary organs are normal. Liver normal, with exception of the edge and corresponding convex portion of the right lobe, which is stained with bile for a space of 5 cm.; weight, 1,260 grams.

Gall bladder small and filled with light green bile. The stomach contains 300 c. c. of coagulated blood. The intestines and pancreas are normal. The spinal cord was not examined.

R. R. H.

H. S. M.

J. M. G.

CASE 7.

Descending thoracic aorta.

J. T.; aged 33 years; nativity, Scotland; admitted to the United States Marine Hospital, Port Townsend, Wash., February 18, 1898; died February 28, 1898.

History.—General health excellent until lately. Never received hospital treatment before. Six to ten years ago had gonorrhoea. Four years ago, without apparent cause, the right testicle enlarged and became painful. Integument became adherent. Later an abscess of testicle ruptured and there was a sinus for many weeks. This testicle is now enlarged and integument adherent at lower end. Left testicle atrophied. He acknowledges sexual excesses. No other evidence of possible syphilis adduced. Six weeks ago he began to have a "fullness in stomach," then some pain in back, later a sharp cutting pain beneath lowest ribs on left. He came directly from a ship on which he had been second mate since May, 1897, and is positive these last symptoms were not noticed earlier. He is of very fair complexion, ruddy in face, in good flesh. He does not consider himself sick, but yet complains of this cutting pain referred to lower part of left chest, anteriorly and posteriorly. It recurs with every long breath, and at times becomes unbearable when he lies down. There was no change in this symptom. He was usually quite easy during the day, if careful to avoid deep inspirations, but at night there was more pain, and he often sat up part of the night in his chair; yet several nights he slept well. Expulsion of gas from bowels or a laxative gave him ease by relieving the sensation of fullness in abdomen. Bowels rather constipated. Tongue coated. Examination of lungs negative. Temperature every morning 36.8 C. to 37.1 C., evening 37.3 C. to 37.7 C. degrees. Pulse 82 to 94 at different times. Apex beat of heart in 5th space, 4 cm. within nipple line. Action of heart quite forcible, perceptible heaving of chest, apex beat very plain to eye. No enlargement of heart could be made out. There was a distinct systolic murmur, loudest at and just within apex beat, very slightly propagated into axilla, audible over an area about 6 cm. in diameter, inaudible in areas of aortic and pulmonary valves. No friction murmur could be discovered and no dullness anywhere in left chest. A diagnosis was made from the apparent mitral systolic murmur, but it was seen that this did not account for the symptoms. Chemic and microscopic examination of urine was negative. About 11 p. m. February 28 the patient in the next bed heard him call out, then fall back on the bed (on which he had been sitting). The night nurse was summoned and found him dead. I saw the body within a few minutes and was struck by the pallor of the whole surface.

Necropsy (March 1, 1 p. m.)—Body very pallid. Abdominal cavity first opened: everything apparently normal. On removing sternum clear serum began to flow from left pleural cavity, but this proved to be only on the surface, and beneath was a blood clot filling whole pleura sac. Left lung was collapsed, but otherwise normal. The right lung was normal. Pericardial sac contained about 20 c. c. clear fluid. On external surface of heart were a few milk-white areas. Heart small, contracted, very firm, and contained no blood. One cusp of aortic valve (toward interventricular wall) had a warty, fringe-like growth across ventricular surface just within free margin. All valves competent and otherwise normal.

Aorta near heart showed atheroma and calcareous deposit in a small area; there was also in the coronary arteries slight evidence of atheroma. At lower part of left pleural cavity, just above diaphragm and in proximity to vertebral column, was an opening about 3 cm. in diameter, apparently leading into a small cavity. The aorta was dissected out from the heart down, and just above diaphragm was a sudden enlargement of the vessel, closely attached to the vertebral bodies. The wall was here friable, but nowhere absent, and could be dissected off. At the lower part of this expansion, just above diaphragmatic aperture, the wall was ruptured and opened into left pleural sac, as already described. Evidence of atheroma was seen at several places along aorta, which was removed to bifurcation. Liver, spleen, pancreas, adrenals, and kidneys were apparently normal externally and on section. Sections of kidneys were very pale. No other examination made.

S. D. B.

CONGESTION OF THE LUNGS.

G. K.; aged 43 years; nativity, Germany; admitted to United States Marine Hospital, Baltimore, Md., January 25, 1898; died January 26, 1898, at 2.40 a. m.

History.—Patient has been generally healthy, except that he had rheumatism twice, once eight and again four years ago. He has used alcoholic beverages freely. He had been drinking heavily three days ago and got wet. He first felt pain in the head, followed by pain in the back and abdomen, and dyspnoea. On admission he complained of pain in throat and back (between shoulders), dysphagia, and anorexia. He lies on his right side, as it gives him pain to lie on left side. Respiration somewhat labored, no cyanosis and but little cough, expectoration of clear mucus. Dullness on percussion over right apex and in scapular region on same side. Roughened vesiculo-bronchial breathing at both bases posteriorly. Jacket poultice applied and strychnia sulphate ordered. Temperature 38 C. and pulse 140. The pulse could not be felt at either wrist. The patient became very restless and complained of much pain. Morphia sulphate was given with some beneficial effect. He slept until 1 o'clock a. m., at which time he awoke with coughing and dyspnoea. Strychnia sulphate given with some relief to patient. At 2.40 a. m. he complained of choking, coughing violently. Nurse went to call the interne, but patient died before assistance came.

Necropsy (nine and a half hours after death).—Body well nourished. Superficial fat very thick. Heart muscle firmly contracted on left side but flabby on right side; valves appeared normal and held water. Right lung weighed 510 grams, adherent on external and posterior surface of upper and middle lobes; upper and middle lobes deeply congested. Left lung weighed 490 grams; organized adhesions at apex; two areas of engorgement, one at apex posteriorly and the other posteriorly in lower lobe. Kidneys were large and uniformly dark in color, capsules nonadherent. Other organs were normal in macroscopical appearance.

C. H. G.

G. P.

LOBULAR PNEUMONIA, HEMIPLEGIA.

CASE 1.

H. H. (colored); aged 50 years; nativity, New York; was admitted to the United States Marine Hospital, Chicago, Ill., September 30, 1897; died April 9, 1898.

History.—He had had syphilis four years ago. One year ago he was treated for orchitis of both testicles, from which he recovered. For the last month he had suffered from severe headaches. These grew steadily worse until one week ago, when he was suddenly paralyzed on the left side. This began with muscles of the

face, followed soon afterwards by the arm, body, and legs. His trouble has grown steadily worse since the onset. On examination left side of face and tongue were found to be completely paralyzed. Arm not so completely and leg slightly so. The patient walked with a shuffling gait. Both testicles enlarged and not very painful; have been enlarged for ten months. The patient was put on potassium iodide in increasing doses, sometimes taking as much as 5 c. c. of saturated solution three times a day. Some slight improvement was noticed in the power of movement, but his mental condition grew decidedly worse. The patient had great depression in spirits and cried constantly. He gradually lost the power of his speech and became imbecile. On the 19th of February he had ptosis of the right eyelid and was drifting slowly into settled melancholia. The patient complained at this time also of sleeplessness and pains in the head, but his mental state was such that no reliance could be placed upon his statements. Potassium bromide was still administered. During the entire month of March he was in a dazed and stupid condition. The latter part of the month he could not be aroused and could not talk. On the 3d of April he took to his bed. Right lung was slightly dull on percussion, many râles; a very offensive muco-purulent expectoration was present. Incontinence of urine and feces set in. He was given increased doses of strychnine, .003 grams three times a day. Temperature was normal and pulse strong, but he gradually became weaker. On April 9 he became much worse, dying at 10.45 p. m. in a state of collapse.

*Necropsy (four and one-half hours after death).—*Height, 5 feet 7 inches. Circumference at shoulders, 1.13 meters. Post-mortem lividity wanting. Rigor mortis commencing. General nourishment, good. Pupils equal and normal. Head: Hair, black and thick; scalp, normal; no irregularities on skull. Skull: Thin for a negro. Dura mater: Thickened and slightly adherent to skull. The arachnoid membrane was also thickened. Pia mater: Normal. Longitudinal lines contained a large number of small calcareous bodies. All the venous vessels of the brain were larger, dilated, and tortuous. The circle of Willis was complete, but the arterial coats were thickened. On section, the gray matter was thicker than normal. Small punctiform hemorrhages were scattered throughout the brain matter. Internal capsule was normal on gross appearance. Lenticular nucleus and optic thalamus seem to be larger than normal. The ventricles were filled with fluid, and on opening the dura an excessive amount of fluid escaped. Entire brain weighed 1,200 grams. No gumma, cysts, abscesses, or hemorrhages were discovered in any part. Thorax: Anteriore mediastinum normal. Remains of thymus gland not found. Heart: Weight, 280 grams; small size. Aortic, mitral, pulmonary, and tricuspid valves competent and normal. Both ventricles normal. Thoracic and abdominal aorta normal. Larynx: Trachea normal. Left lung: Weight, 580 grams; emphysematous at the apex; rest of lung normal. Few pleural adhesions on the right side. Right lung: Weight, 440 grams. On section bronchioles were enlarged and thickened and filled with pus. Entire lower lobe congested and showed bronco-pneumonia. Peritoneum normal. Omentum very fatty. Tongue, pharynx, and œsophagus normal. Stomach normal in size; contained 100 c. c. of greenish fluid; walls normal. Pylorus, patulous and slightly thickened. Small intestine normal. Appendix: Bound down with dense adhesions, 18 cm. in length, and filled with fecal matter. Large intestine and rectum normal; containing a small amount of feces. Liver: Dark red; weight, 1,350 grams. Capsule adherent. Increase of fibrous matter on section. Gall bladder distended with bile; contained 53 c. c.; duct patulous. Pancreas: Red; weight, 80 grams; duct patulous. Genito-urinary organs—Left kidney: Weight, 120 grams; capsule adherent; small amount of pus in one of the calices; pelvis and ureter normal. Right kidney: Weight, 120 grams; capsule adherent;

normal on section; pelvis and ureter normal. Bladder contained 120 c. c. of urine; normal walls. Penis had scar and induration of an old chancre. Testicles were enlarged and fibrous. Prostate normal. Supravental bodies normal; left weighed 4 grams; right weighed 3 grams. Spleen, small; weight, 40 grams. Spleen normal on section. Cause of death was apparently intercurrent lobular pneumonia of right lung.

M. H. F.

H. W. S.

CASE 2.

Double—Chronic nephritis.

C. A.; aged 53 years; nativity, Sweden; was admitted to the United States Marine Hospital, post of San Francisco, Cal., March 19, 1898, and died April 18, 1898.

History.—Patient five weeks before his admission to the hospital had had a severe chill, followed by fever with pain in his side. He coughed constantly and expectorated freely. Physical examination showed the chest movements were greater on the left side. Patient was dyspneic and face was flushed. Vocal fremitus was increased on the right side posteriorly. Percussion elicited dullness of lower lobe of right lung. On auscultation, moist bronchial and subcrepitant râles were heard over both lungs, while, over the lower lobe of the right lung, bronchial breathing was present. The heart dullness was increased to the right of the sternum. The sounds were weak—but no murmur was present. The liver and spleen were normal. Pulse was regular and strong. Under treatment the patient improved steadily, the pulse became stronger, the dyspnea less marked, the expectoration more free, and the dullness of the right lung was much decreased, but on April 6, 1898, there was a decided change for the worse. The pulse became rapid and thready, the dyspnea more marked, and oedema of the lower extremities was noticed. Although careful stimulation was administered, the dyspnea and oedema increased; patient became delirious and died at 2 a. m. April 18, 1898.

Necropsy (eleven hours after death).—The body is that of a well-developed, well-nourished adult white male. The lower extremities are very oedematous. Rigor mortis well marked. The skull cap, brain case, the sinuses and vessels, and the brain are normal. Weight of brain, 1,340 grams. The meninges in the region of the sagittal suture are adherent to the brain, while the vessels are distended with blood. The pericardial sac is distended with serous fluid. Heart is enlarged—muscle is soft and tears easily. Weight of heart, 650 grams. Valves are normal. The pleura at the base of the left lung shows a few adhesions, while the parietal and visceral layers of the right lung pleura are adherent both at the base and at the apex. The left lung, upon section, shows the lower lobe to be greatly congested, while the upper lobe exudes a serous fluid when incised. Weight of left lung, 460 grams. The right lung, upon section, shows the middle and lower lobes to be greatly congested. Weight of right lung, 680 grams. The peritoneal cavity contains 150 c. c. of serous fluid. The spleen is soft, spongy, and very much congested. Weight, 210 grams. Both kidneys are lobulated and are greatly congested. The right contains an increased amount of fat. Weight of right kidney is 170 grams; left, 200 grams. The remainder of the genito-urinary organs are normal. The liver is much congested. Weight, 1,700 grams. The rest of the gastrointestinal tract is normal. The spinal cord was not examined.

R. R. H.

T. B. P.

J. M. G.

PNEUMONIA LOBAR.

CASE 1.

B. H.: aged 41 years; nativity, Ireland; admitted to the United States Marine Hospital, Stapleton, S. I., May 16, 1898; died May 19, 1898.

History.—Illness began with a diarrhea, which compelled him to go to bed on May 10; on the 12th he had a chill which lasted until the following day. An acute pain then commenced in the region of the lower lobe of the left lung, accompanied by a cough and considerable expectoration. From this time until the following Monday, when he was sent to the hospital, he was without treatment or restraint. Condition on admission: A typical pneumonia countenance; thickly coated tongue; respiration, 44 per minute, shallow and considerably embarrassed; heart, 112 per minute and fairly strong; pulse, full and strong; complains of pain on inspiration and changing position, the pain being localized a short distance below and to the left of nipple; has not slept or eaten anything for three or four days; bowels have been opened freely and he feels quite weak. Right lung, respiratory murmur exaggerated, mucous râles heard throughout its extent, but they are not marked. Left lung, respiratory murmur exaggerated and mucous râles marked in upper lobe, the lower lobe giving all the physical signs of consolidation. Heart, normal.

May 17, 1898.—Respiration, 45; pulse, 110; temperature, 40; in the morning his condition was the same as the preceding day: in the afternoon he became delirious and had to be constantly attended; marked râles and bronchial breathing are heard over both lungs.

May 18, 1898.—Respiration, 50; pulse, 110; temperature, 40; still delirious, but can be roused: œdema of lungs becoming marked; chest is filled with mucous râles: some cyanosis of lips and nose.

May 19, 1898.—Respiration, 40; pulse, 90; temperature, 40.4; unconscious and can not be roused: died at 6.45 a. m.

Necropsy (eleven hours after death).—Weight of body, about 157 pounds; height, 5 feet 9 inches; iron-gray hair, black mustache, brown eyes, and dark complexion. Rigor mortis and post-mortem lividity are present and marked. Pericardium normal in appearance and contains 100 c. c. serous fluid. Heart weighs 400 grams. The chambers, particularly the auricles, are filled with clots: there is some sclerosis of valves particularly the aortic, but it is not marked. There are several atheromatous plates in the beginning of the aorta. The muscular substance is normal in color, but slightly thickened: this is no doubt physiological. Pleura: The right pleura is congested; the cavity contains 500 c. c. of sero-fibrinous exudate; there is a considerable accumulation of fibrin over the apex and diaphragmatic portions; it is of recent formation and is easily stripped off. The left pleura is deeply congested, and its cavity contains 200 c. c. of fluid of the same character as the preceding. The lymph deposit extends over a greater area and is more firmly attached than on the right pleura. Lungs: Right lung weighs 1.360 grams. It is adherent to the diaphragmatic portion of pleura and covered with a fibrin deposit over the upper and lower lobes. The surface presents a deeply congested and mottled appearance. The upper and lower lobes are crepitant, deeply congested, and contain a considerable quantity of fluid. The middle lobe and the adjacent portions of the upper and lower lobes are consolidated and in the stage of beginning gray hepatization. The border of the consolidated area is red, merging into a gray or purulent infiltration toward the center. Left lung weighs 1.800 grams. It is markedly adherent throughout its extent, with the exception of the apex. Presents the same congested and mottled appearance, and covered with fibrin as was the opposite lung. The upper lobe is crepitant, but intensely

congested, especially at the lower border, where it is almost consolidated. The lower lobe is consolidated and in transition from red to gray hepatization; the purulent infiltration is marked and exudes on section as a creamy pus. Omentum is normal. Intestines: The stomach is distended with gas and contains no fluid. The intestines are also distended with gas and are normal in appearance.

The appendix is normal, about 8 cm. in length, points downward, and has a meso appendix within 2 cm. of its extremity. Gall bladder: Distended, with 100 c. c. of bile. Its ducts are normal. Liver: Weight, 1,970 grams. It is normal in color. On the upper surface of the right lobe is a stellate cicatrix with four radiations each about 3 cm. in length. At the junction of these is a nipplelike projection of liver tissue. The scar extends about 3 cm. into the liver and was evidently caused by an hepatic abscess. The peritoneum over this area was somewhat thickened, but not markedly so; it was firmly attached to the radii. Spleen: Weight, 200 grams. Is deeply colored and congested. The capsule is normal. The organ is abnormally soft and pulpy in consistence and seems to be almost structureless. Kidneys: Right weighs 150 grams and is normal in appearance; left, 170 grams and is normal in appearance. Pancreas normal in appearance. Bladder contains 50 c. c. of fluid and is normal in appearance.

H. B. P.

G. W. S.

CASE 2.

J. B., aged 59; nativity, Maryland: was admitted to the United States Marine Hospital, Baltimore, Md., April 29, 1898, and died May 1, 1898, at about 11.30 p. m.

History.—Not obtainable, both because the patient was stone deaf and because he was irrational from the time of his admission to hospital. He stated that he had been sick about four months. Physical examination: Muscular development fairly good; respiratory movements equal on both sides and about 44 to the minute; clavicles not prominent, but there is a prominence over the left scapula posteriorly, which may be due to a lateral bending of the vertebral column to the right; tactile fremitus increased over the right apex posteriorly; dullness marked over right apex anteriorly on percussion; bronchial breathing at right apex anteriorly and posteriorly, and whispering pectoriloquy in same situation; no râles to be heard; cough quite troublesome, and sputum muco-purulent and of a viscid consistence. On admission, pulse 110, respiration 44, temperature 39° C. The temperature fell on April 30 to 38° and on May 1 to 36.4°, but rose again by evening to 38°. Patient appeared weak, but not dangerously ill, the signs being more those of phthisis, and his statement of the duration of his illness was misleading. He began to fail rapidly toward evening, and died during the temporary absence of the nurse from the ward.

Necropsy (eleven hours after death).—Body well nourished; countenance dusky; blood fluid, bright red. Small amount of pleuritic effusion, both sides. Organized adhesions of both pleuræ to parietes of chest, to diaphragm, and to pericardium. Adhesions firmer on right side than on left. Right lung carnified, the upper and part of the middle lobes being in stage of gray hepatization, the lower part in stage of red hepatization. Secondary involvement of the left lung was beginning, there being much congestion of vessels and much effusion seen on section. Heart large, firmly contracted, and filled with red clot. Spleen about twice normal size, and very friable, but appearance of pulp normal on section. Left kidney larger than normal, and very pale in color. Right kidney more nearly normal in size and color. Capsules of kidneys nonadherent. Bladder contracted and empty. Small intestine considerably distended with gas. Liver appears normal on section, and is of usual size. Gall bladder full. Much serous fluid

was poured from the cranial cavity on removing the calvarium, probably 100 c. c. in amount. A cloudy exudate was on the surface of the pia, and the ventricular cavities also contained fluid.

C. H. G.
G. P.

CASE 3.

P. B.; aged 40; nativity, Ireland; admitted to United States Marine Hospital, Stapleton, Staten Island, December 3; died December 4, 1897.

History.—Family history good. In this hospital about one year ago with pneumonia. Two months ago developed ulcers on his penis, which have not yet healed. Four nights ago, while in a boarding house in New York, retired feeling well; awakened during the night some time with severe pains in his chest; began to cough a great deal, spitting up bloody sputa. The next morning he was not able to get up and has been in bed ever since till to-day, when he was brought here in the ambulance. Had no chill at any time, but sweat profusely the night he was taken ill and does so every night. His cough and spitting of blood has continued and he has rapidly lost strength. Some shortness of breath and great weakness. Physical examination made on admission shows the following: Face cyanotic; breathing labored and shallow; constant cough, with expectoration of blood-tinged sputa. Legs and feet are œdematous. Lungs: Expansion on right side much less than on left; dullness over lower right side and tactile fremitus increased here. Pectorophony also increased here very much. Various sizes dry and liquid râles heard over lower right side and a few dry râles over left lung. Heart sounds weak and distant (lying down) and arrhythmical, but no murmur of any kind. Radial pulse weak. Has a general macular, purplish rash (mottling), an ulcer on his penis, a mild paraphimosis, and general glandular enlargement. Temperature on admission, 38.2. Patient was ordered croton oil to be followed by an enema. Morphia sulph., hypodermically if necessary. Hot-water bottles placed around him and several blankets placed over him. Urine ordered measured and patient confined strictly to bed. Later he was ordered strychnine sulph. hypodermically and nitroglycerin. On the above treatment patient had a free sweat and his bowels moved twice from the enema. No effect from croton oil. Despite his stimulation, however, he rapidly grew weaker, and died at 7 a. m., December 4, 1897.

Necropsy (four and one-half hours after death).—Body of a white man, height 6 feet 2 inches, weight 190 pounds, gray hair, reddish mustache, gray eyes, dark skin, well nourished, and well developed. Rigor mortis beginning. Body livid over back, face, neck, and legs. Calvarium removed and cranial cavity and its contents found normal in all respects, save a little fluid at base of brain, a little in the ventricles, and some œdema of connective tissue of choroid plexus. Thorax: Left lung bound to chest wall by one or two small adhesions. A small portion of anterior border of lung at lower end of upper lobe consolidated and on incision found tough and hard, like connective tissue. Considerable frothy, blood-tinged fluid exuded from the remainder of this lung on section; otherwise normal. Right lung bound closely to chest wall by rather strong adhesions. The upper portion crepitant throughout, but considerable frothy, blood-tinged fluid exuded on incision. The lower portion of lower lobe dark purplish in color, but not uniformly so, firm to the touch, and on incision very dark, slightly moist and quite friable. Pieces of it floated when placed in water. Heart: Pericardium contained about 50 c. c. of clear amber fluid, and scattered over its anterior surface a thin whitish deposit. Heart large (weight, 520 grams) and firm. Right chambers distended with easily broken clots and dark fluid blood. Left chambers contained a small

quantity of semifluid blood. Aortic, pulmonary, and tricuspid valves normal and closed well. One leaflet of the mitral valve appeared thin and soft, and the valve did not close well, appearing incompetent. On the endocardium of the right ventricle, in its lower part, was a group of small hard papular projections, which felt firm and elastic and cut hard, like connective tissue. The endocardium of the left auricle around the margins of the mitral valve appeared rough and thickened in spots. Abdomen: Omentum had a good deposit of adipose tissue. Left kidney normal in size, surrounded by considerable fat, capsule stripped off easily, leaving a dark, smooth surface behind, on incision very dark, and contained a good deal of dark blood, which oozed over the incised surface freely. In its cortical substance was found a rather firm, more or less spherical, pale-yellowish body, slightly larger than a large pea. Right kidney, except for the yellowish body in center, similar in all respects to the left. Ureters and bladder normal. Spleen large and contained in its substance a body exactly like that found in left kidney except that it was several times larger. Liver large, its surface rough, hard on section, and showed the "nutmeg" appearance. Stomach somewhat dilated. Intestines normal.

C. H. L.

G. W. S.

CASE 4.

C. B.: aged 35; nativity, North Carolina; admitted to marine ward of St. Francis Xavier Infirmary, Charleston, S. C., March 6, 1898; died March 8, 1898.

History.—Had had fever and cough for six days while on duty as fireman on tug; for the past five days had been confined to his berth during severe storm, in which he suffered from considerable exposure and discomfort. On admission right lung was found to be consolidated; pulse full and 120 beats per minute. Breathing labored; great prostration; mind somewhat dull; moderate expectoration. Patient grew rapidly worse, and died on 8th after several hours of coma, forty-eight hours after admission to hospital.

Necropsy (four hours after death).—Rigor mortis well marked; body slightly emaciated; ears and neck blue from venous stasis. Heart: Weight, 360 grams; right heart distended with firm coagula; left heart empty; valves normal. Lungs: Right lung in a state of gray hepatization; weight, 1,750 grams; pleuritic adhesions to diaphragm; left lung emphysematous; weight, 450 grams. Liver: Weight, 2,000 grams; normal; gall bladder distended with bile. Kidneys: Weight, 200 grams each; both showed some parenchymatous swelling. Spleen: Weight, 240 grams; slightly enlarged and friable. Stomach, intestines, prostate, and bladder normal; bladder contained urine. Brain and other structures of body not examined.

F. F. S.

J. V.

CASES 5.

Pleurisy.

J. F. F.; aged 43 years; was admitted to the marine ward, St. Vincent Hospital, Portland, Oreg., March 5, 1898; died March 12, 1898.

History.—Upon admission the patient said that he had been suffering from a cough for two weeks, and two days prior to his application for treatment had received a wetting which caused a chill and high fever a few hours later. Coincident with this he was seized with severe pain in both sides of his chest, which, however, was most intense on the right side. When first seen he was suffering severe pain in the chest, rapid and shallow respiration, and cough. His temperature was 39° and pulse was accelerated to 100 per minute. An examination revealed the following physical signs: On inspection rapid and shallow respiration and im-

paired respiratory movement was noticed; palpation showed increase in vocal fremitus over the apices of both lungs; percussion revealed dullness over the upper lobes of both lungs; and auscultation detected pronounced friction râles over the entire chest and bronchial breathing in the upper lobes of the right and left lungs, a portion of the lower lobe on the left side, and the middle lobe. A diagnosis of double pneumonia and pleurisy was made. Patient was given strychnia and whisky in full doses, and turpentine stupes were employed for counter-irritation to relieve the pain, which at times was so severe as to necessitate the administration of morphia. On the following day the patient's general condition was the same, and continued so for the following twenty-four hours, temperature being 38.5° in the morning and 39° in the evening; the pulse improved in volume and strength, however, under the medication. On the fourth day an examination showed that the lower lobes of both lungs had become involved in the inflammatory process. On the fifth day of the disease the temperature fell to normal by crisis, but the patient's general condition became worse instead of better. His pulse was quick and weak, 120 per minute, and digitalis was given to supplement the action of the other stimulants. The pain from the pleurisy was excruciating, and the respiration was quick and shallow, 40 per minute. On the following day the dangerous symptoms became more pronounced, and death occurred on the seventh day.

Necropsy (twenty-four hours after death).—External appearances: Body emaciated; post-mortem rigidity slight; post-mortem lividity marked in the loins. Thoracic cavity: Both pleuræ were intensely inflamed and numerous adhesions of recent formation were present; the left pleural cavity contained 250 c. c. of fluid and 200 c. c. existed in the right cavity. Layers of fibrin covered the pleura and the adjacent organs. The lungs presented an interesting study, since they showed the typical pathologic changes occurring in the different stages of pneumonia. The apices of both lungs were in the stage of gray hepatization, their consistency was dense and boggy, and the surface of the section was yellowish gray in color. The fluid scraped from the section was abundant and milky. The middle and lower lobes of the right lung were in the stage of red hepatization and throughout had become of the consistency of the structure of the liver. The cut surface was granular in appearance and the projection of the small fibrous plugs was quite marked. The lower lobe of the left lung was in the first stage, that of engorgement, and the amount of air was very much diminished. The other portions of the lungs were almost devoid of air and readily sank in water. The pericardium was normal and the heart showed no pathological changes. Abdominal cavity: Liver was somewhat enlarged, but showed no other morbid changes. Spleen softened and larger than normal. Other abdominal viscera were healthy. Brain not examined.

J. C. P.

CASE 6.

C. W., aged 32 years; nativity, Missouri; admitted to United States Marine Hospital, St. Louis, Mo., April 15, 1898; died April 21, 1898.

History.—When the patient was admitted he stated that he had been sick for five days, and that he had had a chill followed by a sweat each day. His bowels were loose and he had a slight cough. He said he had suffered from malarial fever about a year ago. Physical examination: Body well nourished. Respiratory movements 30 to the minute; vocal fremitus not increased over either lung; no dullness on percussion over either lung; no râles or rough breathing heard on either inspiration or expiration; no abnormal murmurs heard over heart; pulse 104. Temperature, 39° C. Abdomen tympanitic; liver enlarged, but spleen of normal size; the plasmodium malarial was found in the blood, both the hyaline and crescentic bodies being present. He had a chill on the afternoons of the 16th and 17th instant. On the 18th he had headache and severe pain in his left side.

His bowels were very loose, passing his food undigested. There was considerable whitish expectoration, and slight dullness over the lower portion of the left lung. On the morning of the 19th the condition of the patient was much worse. There was marked dullness over the lower lobe of the left lung; loud moist râles heard over both lungs; profuse reddish-white expectoration; respirations, 36; pulse, 112; harsh rough sounds heard over cardiac region synchronous with respiration; headache and severe pain over left side of chest; abdomen tympanitic; bowels very loose. The temperature on the evening of the 19th fell to normal, the pulse to 100, and the respirations to 32; he was free from pain and he felt comfortable. On the morning of the 20th the moist râles were not present over the right lung, and the respiratory murmur was no longer harsh and unnatural. There was no change in the condition of the left lung from the previous day. Temperature, 39° C.; pulse, 120; respirations, 36. At 6 p. m. the temperature was 38° C.; pulse 120, full and bounding; respirations, 36; no headache or other pain; intellect clear; some perspiration upon forehead. At midnight the pulse failed, and the patient died suddenly at 1.05 a. m. of the 21st instant.

Necropsy (twelve hours after death).—Height 162 cm.; strongly built, muscles well developed. Ears, neck, lower portion of face, and body bluish red. Face covered with short, stubby beard. Adipose tissue of abdomen 5 cm. thick, dark yellow color. Intestines distended with gas; no foreign body in abdomen. Pericardium adherent to sternum; contains about 15 c. c. of straw-colored fluid. Pleura adherent to pericardium and to left side of chest. Heart 10 cm. long, 13 cm. broad, 7 cm. thick. All the chambers of heart and large vessels filled with dark-clotted blood. Wall of right ventricle 1 cm. thick, left ventricle 2½ cm. thick. Valves competent; weight after removal of blood, 368 grams. Left lung adherent to pericardium, to chest wall, and to diaphragm, making it impossible to remove it without tearing its substance. Weight, 2,020 grams. Apex dark-grayish, crepitant, a gray foaming fluid exuding upon section. Lower lobe consolidated, and of a dark-red color, noncrepitant throughout, on section the lung tissue breaks up easily and reddish-gray pus exudes from it. Length of left lung 29 cm., breadth 20 cm., thickness 11.5 cm. Right lung nonadherent; weight, 920 grams; length 27.5 cm., breadth 19 cm., thickness 9 cm.; color grayish mottled with black, crepitant throughout, on section a reddish foaming fluid exudes. Spleen: Weight 220 grams, length 15 cm., width 11 cm., thickness 5 cm.; color, reddish-gray. A white spot on posterior central portion, 2 cm. by 1 cm.; reddish color on inside; substance soft and easily broken. Left kidney: Weight 202 grams, length 12 cm., breadth 8 cm., thickness 5 cm.; kidney tissue congested, but otherwise normal. Right kidney: Weight 170 grams, length 12 cm., breadth 7.5 cm., thickness 3.5 cm.; condition of tissue same as that of left kidney. Bladder contracted and empty. Stomach: Length 26 cm., breadth 11.5 cm.; contains 15 c. c. of yellowish fluid; some of the rugæ congested. No signs of ulceration in lower portion of small intestines. Liver: Weight, 2,600 grams, length 35 cm., breadth 22 cm., thickness 12 cm.; color, deep brown. On section the liver substance was found to be congested and thickened, the knife meeting with considerable resistance. This is especially the case with the right lobe. Gall bladder contains 12.5 c. c. of a yellowish-brown viscid fluid.

W. G. S.

CASE 7.

Double.

H. V.; aged 55 years; nativity, Germany; admitted to United States Marine Hospital, Stapleton, S. I., N. Y., November 11; died November 30, 1897.

History.—Malaria about six years ago; has been sick about two weeks. Fell overboard, and ever since then has not felt well. Gives very vague symptoms;

easily fatigued, some shortness of breath, and slight diarrhea, also lost some in weight and has a slight cough. Physical examination: Fine crepitant râles heard over both apices of his lungs, and some dullness at right apex; otherwise lungs negative. Has no œdema anywhere. Urine found negative. No tubercle bacilli found in sputum, but some pus cocci found. Patient was put on creasote in increasing doses, but failed to improve. On November 17 complained of headache, which continued several days; also complained of general pains. His creasote was discontinued for a while and K. I. given on the 24th. On the night sick call of the 25th patient was found to have a temperature of 39.4°, restless and partially unconscious. He was given some morphia and rested fairly well. The next morning his condition was no better. It was impossible to give any medication. His bowels were moved, ice cap applied to head, and fluid nourishment and stimulation given regularly. His condition showed no improvement, however. Examination of lungs now showed dullness and tubular breathing over both lower lobes behind. He gradually grew weaker and died at 11.50 p. m. November 30, 1897.

*Necropsy (four hours after death).—*Body of a white man; brown hair and moustache; gray eyes; poorly nourished and fairly developed. Rigor mortis marked, and body livid over back. Cranium: Before the sawn skullcap could be removed; a strong though small adhesion of the dura on the right side had to be broken loose. The skullcap was thick with little diploë. The dura appeared thickened, more especially along the fissure of sylvius on both sides, where its thickening was marked. About 75 c. c. of clear amber fluid at base of brain. Over the vertex the pia was infiltrated with fluid. The veins over the cerebrum, particularly on right side, were distended. On section the ventricles were found to contain fluid, and the connective tissue surrounding the vessels of the choroid plexus was oedematous; the surface of the incised brain quite moist; otherwise normal. Thorax: Pericardium contained about 100 c. c. of clear amber fluid. Heart about size of a man's closed fist, and rather pale; otherwise normal in all respects. Lungs: Right bound down closely to chest wall by strong adhesions. The lower lobe and portions of middle lobe firm and airless, of a purple-red color. On section found exceedingly friable, of a grayish-red color and bathed in pus; a cavity about size of a hen's egg in posterior part of lower lobe, its walls rough and the cavity filled with pus. The left lung was bound to chest wall by one or two slight adhesions around its apex; the entire lower lobe in the same condition as that of right lung with the exception of the cavity. Abdomen: Spleen enlarged. Liver normal. Stomach and intestines normal. Both kidneys normal in size and color, capsule stripped off, leaving smooth surface behind. Incision showed nothing abnormal. Bladder contracted, mucous membrane dark-grayish color and covered with a mucous deposit. Ureters normal.

C. H. L.

G. W. S.

CASE 8.

(*Double.*)

F. H.; aged 40; nativity, Norway; admitted to United States Marine Hospital, Stapleton, N. Y., December 29, 1897; died January 2, 1898.

History.—Moderate drinker and healthy until the day before admission, when he noticed some pain in his side. That night he awoke with a chilly sensation and a severe pain in his right side which was intensified when he breathed. He walked to the barge office and was sent to the hospital in the ambulance. Condition when admitted: Pain over right lower lobe and for the first time, cough with bloody sputum. Temperature, 40° C. Inspection showed rapid interrupted (jerky) respiration, with little expansion on either side. Face a little cyanosed.

Palpitation; vocal fremitus not exaggerated in front, but diminished behind, on right side especially. In front and in axillary line, friction fremitus. Percussion about normal in front; behind, dullness, varying to flatness about inf. angle of scapula; on the left side dull at the base behind. Auscultation: Over the lower three-fourths of right lung behind was absence of murmur with decreased murmur over the base of left lung, while in front at the base of right lung could be heard loud friction sounds. Over both lungs breathing short and interrupted. Apex beat not made out. Heart appeared normal, save for accentuation of pulmonary second sounds. Pulse rapid and quick, 120; respiration, 46. Temperature, 40° C. Sputum rusty. Sulph morphia was given. 8.30 p. m. bled 340 c. c. and cold pork to chest ordered, patient felt much better. Physical signs of pneumonia marked by the loud pleuritis sounds; but the following day involvement of the left lung was clear. Pyrexia, exhaustion, and pain persisted. At night the temperature dropped to 39° C., and the patient took nourishment. Strychnine and nitroglycerine ordered on account of heart weakness.

January 1.—Flatness behind subsided and dullness supervened over both lungs. Pectorophony increased, breathing was tubular, liquid râles could be heard over both lungs but no friction sounds. Patient gradually grew weaker and became delirious, getting out of bed at night. In spite of various remedies he died January 2, 8.45 a. m.

Necropsy (seven hours after death).—White man; large frame and muscular; brown hair, reddish mustache, gray eyes. Rigor mortis slight, and lividity marked. Abdomen distended. Calvarium removed: brain membranes were congested. Brain weighed 1,530 grams and seemed normal. Thorax opened: anterior mediastinum normal. Pericardium contained 75 c. c. straw-colored fluid. Heart weighed 370 grams. Right auricle and ventricle filled with clot; valves intact. Left auricle and ventricle contracted: valves intact. Left lung attached to pleura by long, stringy, organized cords, and to the diaphragm directly. The lower lobe was solid in a stage of red hepatization, the upper one oedematous; weight, 1,000 grams. Right lung was entirely covered by a thick, fibrinous exudate which united the lobes, united the lower lobe to the diaphragm, and filled the cavity. The superior lobe was oedematous and the other two in the purulent or unfavorable third stage; weight, 1,220 grams. Abdominal cavity distended by gas within the small intestines and stomach, which organs were normal. The splenic flexure of the colon presented a constricted portion about 3 cm. in diameter. The sigmoid flexure and rectum were filled with feces. The bladder was empty. Liver weighed 2,220 grams. Kidneys were both somewhat large and congested; the right weighed 320 grams, the left one 300 grams. The spleen weighed 250 grams. The other organs not noted.

H. S. C.
G. W. S.

CASE 9.

C. P.; aged 24 years; nativity, Greece; was admitted to the marine ward of St. Vincent's Hospital, Portland, Oreg., on March 12, 1898; died March 26, 1898.

History.—There had been pain in the left side and some fever and prostration for several days before applying for relief. On admission the temperature was 38.5° C.; respiration painful, hurried, and about 30 per minute; pulse 92. The usual physical signs of lobar pneumonia existed on the side affected, together with a small area of dullness a little above the base of the right lung antero-laterally. This was the only symptom referable to the right side. The evening of the 14th found the temperature at its maximum of 40° C., cough and the peculiar expectoration being present. A distinct crisis occurred the following day, the temperature falling to 37° C. and this afebrile condition was responsible for a

feeling of great comfort and rest. To the amazement of all, the temperature suddenly mounted to 40° C. on the 19th, to 41° C. on the 20th, with a weak pulse of 120. A period of suffering, restlessness, and at times light delirium supervened. The fever continued with marked evening exacerbations and morning remissions until death. The heart's action was rapid and weak; at first both sounds were somewhat muffled; later, a blowing, systolic murmur developed.

*Necropsy (twenty hours after death).—*Male, body emaciated. Rigor mortis marked; lividity not marked. All tissues and cavities remarkably dry, the pericardial sac alone containing a normal amount of fluid. Thoracic cavity: The pericardium and heart are normal in size and outward appearances. Right auricle distended with ante and post mortem clots. Left ventricle and auricle contained ante-mortem clots. The valves, with the exception of the bicuspid, were normal; it showed some thickening. The heart weighed 290 grams. Left plural sac contained some fibrin clots and showed an intensely congested external wall. Numerous adhesions, old and recent, binding the lung posteriorly, laterally, and to the pericardium, existed. The lower lobe of the left lung and the greater portion of the upper were in the stage of red hepatization; several calcareous deposits were found in the apex. It weighed 1,290 grams. There were no adhesions or fluid in the right side. The lung here was crepitant and normal in size and color; at the junction of the middle and lowest lobe a scar 7 by 5 cm. was present. Abdominal cavity: The borders of the liver were rounded and the substance hard and firm; gall bladder contained 3 c. c. fluid bile; ducts patulous, no stones. Section of the liver showed an increase of connection tissue; it weighed 2,268 grams. Kidneys, capsules, and spleen normal in size, consistence, and color. The two kidneys weighed 300 grams, and were not noticeably congested. The gastrointestinal tract and the genito-urinary apparatus were normal. The brain and its membranes, ventricles, and sinuses appeared normal. The vessels of the pia covering the cerebellum were somewhat congested; weight of the brain, 1,360.8 grams.

R. B.

CASE 10.

Empyema.

J. O. B.: aged 35 years; nativity, Illinois; admitted to United States Marine Hospital, Chicago, Ill., April 5; died April 28, 1898.

History.—Patient has had the ordinary diseases of childhood and an attack of gonorrhœa; otherwise health has been good. Three weeks before admission he had a chill and sweat, with headache, nausea, and loss of appetite. From that time to date of admission he had a cough and vague pains in the back. On examination of the chest the following conditions were found: There was diminished movement on the right side. The apex beat was a little to the left of the nipple, but there was no bulging of the intercostal spaces. Tactile fremitus was absent on the right side. The entire right lung was dull from the liver to the clavicle. Respiratory sounds and vocal fremitus were absent. The heart and left lung were normal. A diagnosis of pleural effusion was made and the chest cavity was aspirated that day and 2,100 c. c. of clear serum was withdrawn. Strongly stimulating treatment, consisting of strychnine, quinine, and whisky, was given and large doses of sodii salicylate were tried. Despite this his temperature kept up, hovering between 38° and 40° C., with a corresponding pulse. Cough and pain in the side became more marked. On the 17th of April the patient was etherized and about an inch of seventh rib removed in the midaxillary line. The pleura was freely opened and a large quantity of cloudy serum escaped. He was thoroughly washed out with sterile water and a large double

drainage tube inserted. The stimulating treatment was continued and the pleural cavity was irrigated twice a day with a weak solution of carbolic acid. The cavity was also irrigated at intervals with a solution of bichloride of mercury 1:2000. At one washing each day the solution was allowed to remain in the chest for an hour before being permitted to escape. The discharge soon became purulent. On the 22d of April a pronounced bloody diarrhea set in, with tenderness of the abdomen, and marked nervous symptoms. Widal's test for typhoid fever was applied to a specimen of his blood, but no reaction characteristic of that disease occurred. His urine was also examined with negative results. On suitable treatment the diarrhea ceased, but fever still continued high, and as the heart was weakening digitalis was given three times a day. Alcohol baths were given whenever the temperature was above 38° C., with the result of keeping the fever down somewhat. On the 25th he became suddenly much worse, with hurried respiration and failing heart. The left lung was now hyper-resonant and bronchial breathing was marked. Despite all treatment he continued to sink and died at 3.02 a. m., April 29.

Necropsy (twelve hours after death).—Rigor mortis marked. Body fairly well nourished. Slight post-mortem lividity. Pupils moderately dilated. Pericardium adherent to chest wall, obliterating anterior mediastinum. Pericardial sac contained about 40 c. c. of clear fluid. Heart weighed 280 grams, pale yellow in color, and chicken-fat clots in right ventricle; valves competent and walls normal. Aorta normal. Nares, larynx, and trachea apparently normal. Left lung weighed 650 grams; emphysematous; pus in some of the large bronchi; large area of consolidation in lower lobe near great vessels. Pleural cavity normal. Right lung was found collapsed at the bottom of pleural cavity, entire pleura and lung covered with pus. Lung weighed 900 grams. On section had the exact appearance of liver, being in the stage of red hepatization; parietal and visceral pleura a good deal thickened. Peritoneum normal. Omentum contained a good deal of fat. A few enlarged mesenteric glands were found. Stomach normal; contained about 120 c. c. of yellowish fluid. Small intestines were distended with gas and empty. Cæcum was also distended, but no ulcers were found. Appendix was small, pointing toward the liver, and contained fecal matter. Rectum distended with feces. Liver weighed 2.935 grams; yellowish on section; capsule adherent. Gall bladder small and contained about 20 c. c. of clear yellow fluid; duct patulous. Pancreas weighed 90 grams. Left kidney weighed 210 grams; capsule adherent and thickened; substance very friable; cortical part overgrown at the expense of the pyramids; entire substance yellowish and pyramids irregular. Pelvis very small and infiltrated with fat. Right kidney weighed 180 grams; substance same as the left. Ureters normal. Bladder very small; contained about 40 c. c. of milky urine; walls thickened; mucous membrane normal. Prostate normal. Spleen weighed 190 grams; surface smooth; normal on section. Head small; scalp normal; skull regular and thick. Brain and membranes normal except pia mater, which was somewhat congested. Cause of death was lobar pneumonia of right lung, complicated with the empyema.

M. H. F.
H. W. S.

CASE 11.

R. W. (colored): aged 49 years; born in Kentucky; admitted to the United States Marine Hospital, St. Louis, Mo., May 2, 1898; died May 7, 1898.

History.—The patient was brought to the hospital in a very weak condition. He stated that he contracted a cold two weeks before admission, but that his present symptoms did not appear until April 27, when he had a severe pain in his side, accompanied by a cough and yellow expectoration. He also had pain in his abdomen, with vomiting and purging, the vomited matter having a bitter taste. Physical examination: Body well nourished, but face thin and eyes dull and list-

less. Depressions above both clavicles. Respirations, 60, but movements very deficient, vocal fremitus increased over left lung, marked dullness over base of left lung. A great many râles heard over both lungs, but over the base of the left lung the respiratory murmur is very feeble. Pulse, 120. A blowing murmur transmitted to the left heard over the apex of the heart. Temperature, 39° C. Tenderness on pressure over abdomen, bowels very loose, patient too feeble to expectorate anything. The next day his condition was somewhat improved, his temperature fell to normal, his respirations to 32, and his pulse to 96, but his pulse was weak and hardly perceptible at the wrist. His abdominal symptoms subsided and his respiratory murmur was much clearer. His pulse improved under free stimulation; but the following day he had difficulty in swallowing, and sank into a stupor, in which he died at 1 a. m. on May 7, 1898.

Necropsy (twelve hours after death).—Height, 180 cm.; muscles well developed; teeth covered with sordes; rigor mortis well marked; abdominal wall $1\frac{1}{2}$ cm. thick; intestines of a dull gray color, containing a small quantity of gas. There was a quantity of fat on the outside of the pericardium and a little straw-colored fluid in the cavity. Weight of heart, with contained blood clots, 637 grams; length, 17 cm.; breadth, $13\frac{1}{2}$ cm.; thickness, 9 cm. Right ventricle empty; thickness of walls, 1 cm.; valves competent. Left ventricle contained a white clot extending into the aorta; thickness of walls, 2 cm. One of the leaflets of mitral valve very small, the other one roughened by large nodules at apex. Left lung nonadherent; weight, 1,370 grams; 26 cm. long, 19 cm. broad, and 8 cm. thick; upper lobe dark reddish gray, crepitant, and on section red frothy liquid exuded; lower lobe hard, noncrepitant, dark-red color; on section dark-red fluid exuded. Right lung adherent behind and below; weight, 625 grams; 25 cm. long, 16 cm. broad, 8 cm. thick; apex same as left lung; base much torn in taking out of cavity, soft, noncrepitant, and of a dark-red color. Stomach 32 cm. long, $7\frac{1}{2}$ cm. wide at greatest diameter; contained 32 c. c. of a yellowish fluid. Spleen: Substance very soft; was torn to pieces in removing; internal structure dark brown, almost black. Left kidney, 14 by 10 by 6 cm.; weight, 250 grams; structure normal. Right kidney, $13\frac{1}{2}$ by 9 by $5\frac{1}{2}$ cm.; weight, 180 grams; structure normal. Bladder contained a small quantity of urine. Liver, 2,050 grams in weight, 31 by 23 by 10 cm., externally dark red, internally dark brown, dark-red fluid exuding upon section. Gall bladder contained 5 c. c. of bile.

W. G. S.

CASE 12.

N. S. (colored): aged 18 years; nativity, Alabama; admitted to the United States Marine Hospital, Cairo, Ill., March 25, 1898; died April 6, 1898.

History.—Was sick about two weeks before coming to hospital, the symptoms being chilliness, fever, pain in left side of chest of a sharp character, felt chiefly on inspiration. There was almost continuous coughing, the expectoration being tinged with blood. Physical examination: Want of clearness on percussion over the upper portions of both lungs, with moist râles and bronchial breath sounds.

March 28.—The upper portions of the lungs have cleared up considerably, but the base of the right shows dullness and bronchial breathing. Patient began to improve April 1, and by the following day had a normal temperature. He slept almost continuously. On the evening of the 5th, however, he became restless and delirious, and died at 1 p. m. on the 6th.

Necropsy (twenty-one hours after death).—General state of nutrition poor. Rigor mortis present. Froth exuding from mouth and nose. In the parietal region of the skullcap, both inside and outside, there were blue lines and a general bluish discoloration from enlarged vessels of the diploë. The dura mater was thickened along the superior longitudinal sinus and in other smaller areas. The sinuses were filled with dark grumous blood. The pituitary body was apparently softened and dark-colored, the vessels in the connective tissues about it being

injected. The subarachnoid space was somewhat distended with serous fluid. The pia mater was deeply injected, especially in the sylvian fissure. The lateral ventricles contained an excess of fluid. Thorax: The large vessels about the heart were normal. The pericardial sac contained about 30 c.c. of fluid. There was a deposit of fat along the coronary vessels. The heart was of normal size: valves normal; heart muscle firm and of bright-red color. The cavities contained soft clots of blood. Lungs: There were some easily-broken adhesions to chest wall posteriorly. The upper lobe of the left lung and a greater portion of the right lung were deeply congested, showing small black spots of local hemorrhages. Upon squeezing the lung, frothy blood exuded from the cut surface. One quite large hemorrhagic infarct was found on the surface of the left lung. There was no induration or hardness such as is found in the second stage of pneumonia. No signs of tubercle were found. The large bronchial tubes contained a small quantity of frothy secretion. Abdomen: Omentum thin, vessels injected. Spleen: Size, 14 by 7 by 4 cm.: of pearly-gray color externally; cut surface dark red: contained little blood. Kidneys rather pale in color; of normal size; no pathological appearances. Stomach presented large areas of dark-red mucous membrane: no ulceration. Ducts of gall bladder normal. Small intestine: Peyer's patches at lower end of ileum rough and irregular and with much of the mucous surface in this locality of dark-red color. The solitary glands were very prominent and the mesenteric glands enlarged. Large intestine and appendix normal: also the bladder and genital organs.

P. C. K.

CASE 13.

Pleurisy.

G. De C.: aged 38 years; a native of Pennsylvania; was admitted to the marine ward, Mercy Hospital, Pittsburg, Pa., March 25, 1898, and died April 1, 1898.

History.—Good. He had been suffering for ten days before admission with fever. When admitted to hospital his temperature was 39°. It fell 1° in the morning, only to rise again to the same height in the afternoon of the 26th. The liver and spleen were enlarged. There was tenderness over the left lobe of the liver. Respiration good, and no pain complained of in the chest. On the 27th, he complained of pain over base of right lung. There was no dullness nor friction sound. The temperature was 5° lower in the afternoon than on the day before.

March 28.—There was well-marked dullness over apex of right lung. Respiration 35; pulse 120, feeble. Respiratory sound puerile over left lung.

March 29.—Seemed better.

March 30.—Resolution beginning. Respiration 40; tongue dry; pulse weak.

March 31.—Tongue moist; pulse very weak and fast, 120. Patient seemed restless; did not complain of any pain.

April 1.—Patient died suddenly at 2 a. m. He had been comfortable during the night and free from pain.

Necropsy (eight hours after death).—Body that of a man slightly built, and would weigh about 55 kilos. He was about 1.3 meters tall. Rigor mortis well marked. Body free from scars. There was no fluid in either pleural cavity: the plenæ on both sides were covered with a fibrinous deposit. The right upper lobe was solidified and in the stage of gray hepatization. The lower lobes of right and the left lung were healthy. Liver was enlarged and pale; softer than normal. Spleen large, pale, and friable. Kidneys enlarged. Diagnosis from post-mortem examination: Malarial fever, lobar pneumonia, and pleurisy.

C. T. P.

CASE 14.

Fatty degeneration of kidneys and liver.

J. M. (colored); aged 21 years; nativity, Indiana; admitted to the United States Marine Hospital, Cairo, Ill., March 15, 1898; died March 19, 1898.

History.—Was ill a week before coming to the hospital with diarrhœa and cough. He complained of pain in the left side and has marked dyspnœa. There is a large quantity of frothy sputum, tinged with blood. This, under the microscope does not show the pneumococcus. Physical examination: The lungs give a dull percussion note over their upper portion; more marked in small areas. The left lung on auscultation gives bronchial breath sounds and moist rales. The same signs present on the right side to a less degree. Posteriorly: Dullness especially noted at the apices.

March 17.—Much better to-day; breathing easier; sputum less in quantity.

March 18.—Dyspnœa returned; character of sputum the same as on day of admission. The urine contains albumen.

March 19.—Death occurred at 1 p. m.

Necropsy (twenty-one hours after death).—State of nutrition fair. Rigor mortis present. Brain: Weight, 1,375 grams; dura mater thickened and opaque, especially over anterior convolutions and superior longitudinal sinus. This sinus contained a fibrinous clot throughout its entire length. The veins on the surface of the brain were distended with dark-colored blood. Vessels of pia mater very much injected over the entire surface. The lateral sinuses contained dark-colored blood. Lungs: The pleura was covered at some points with yellowish fibrin. There were slight adhesions on both sides between the lung and the diaphragm, the adhesions being easily torn. The edges of the lungs show emphysema. The left lung in its upper portion is consolidated, but rather nodular to the feel. The upper portion of the right is also firm to pressure, but less so than the left. The summits of the apices show healed tubercular cicatrices. The cut surface of left lung is red in color and sinks in water. Portions of the lower lobe are in a similar condition, but show an earlier stage of the pneumonic process. There is an escape of dark fluid blood from the cut surface upon pressure. In the visceral pleura there were many pin-head spots of a whitish color, apparently tubercular. Right lung: Upper lobe shows pneumonic consolidation; cut surface light colored, exuding serum on pressure; no pus in smaller bronchial tubes of this side; lower lobe crepitates on pressure and shows very little congestion; large bronchial tubes show inflamed mucous surface covered with purulent secretion. Weight of lungs: Right, 750 grams; left, 875 grams. Heart: The vessels on the surface were distended; the right ventricle contained firm fibrinous clots; valves of heart competent; muscular tissue firm; weight of heart, 655 grams. Abdomen: The omentum contained very little fat. Spleen: Weight, 120 grams; surface shriveled; shape, long and narrow; color (cut surface), light red; very little blood. Kidneys: Capsules adherent; surfaces show numerous lines of contraction; almost complete fatty degeneration of cortical portions: the cortical columns of fat extend between the pyramids toward the central portion of the organ; weight, 165 grams each. Liver: Weight, 2,060 grams. The surface presented yellowish patches, corresponding in size to numerous spots shown on cut surface, due to fatty infiltration. The color of the cut surface was light brown. The bladder, genital organs, stomach, intestines, pancreas, and great vessels were of normal appearance.

P. C. K.

CASE 15.

Valvular disease of heart—Mitral regurgitation.

W. E. J.; aged 31 years; nativity, New Jersey; was admitted to the United States Marine Hospital, port of San Francisco, Cal., March 23, 1898, and died April 2, 1898.

History.—Patient was deaf and dumb. He had been ill about three weeks. Had had a cold, which settled on his chest. Physical examination showed that chest was well shaped. Movements were increased on left side; vocal fremitus increased on right side posteriorly. Percussion showed dullness of the middle and lower lobes of the right lung posteriorly. Upon auscultation bronchial breathing was heard over the areas of dullness; moist and sonorous bronchial rales were also present. Heart area was increased downward and to the left; mitral murmur was heard at the apex. Liver and spleen were normal. The abdomen was distended with gas and tenderness was felt upon pressure. The patient refused all medicine; occasionally he could be induced to take some whisky. He gradually grew weaker and died at 7.20 p. m. April 2, 1898.

Necropsy (fifteen hours after death).—The body is that of a well-developed, though slightly emaciated, adult white male. Rigor mortis well marked. Encephalon normal. Weight of brain, 1.410 grams. The pericardium is normal. Heart is hypertrophied; edges of mitral valve are thickened and atheromatous; weight of heart, 740 grams. Both pleural cavities are normal. The right lung upon section shows hypostatic congestion of the lower lobe with area of consolidation not completely cleared in the remaining lobes; weight, 1.170 grams. Left lung upon section shows lower lobe to be in a condition of hypostatic congestion; weight, 800 grams. The peritoneal cavity is normal. Spleen normal; weight, 170 grams. The right kidney is very much contracted; cortex thinned; capsule adherent, and the central pyramids are absent; weight, 80 grams. The same conditions obtain in the left kidney; weight, 80 grams. The remainder of the genito-urinary organs are normal. Liver normal; weight, 2.100 grams. The rest of the gastro-intestinal tract is normal. The spinal cord was not examined.

R. R. H.

J. M. G.

CASE 16.

Pericarditis suppurative.

M. L.; aged 34 years; nativity, Norway; was admitted to the United States Marine Hospital, port of San Francisco, Cal., December 31, 1897, and died January 2, 1898.

History.—Patient, while on a prolonged alcoholic debauch, was taken ill Sunday, December 26, 1897. He had a severe chill, followed by fever, with pain in the right side, especially aggravated by coughing. He, however, refused to accept medical relief until brought to the hospital by his friends, who were alarmed at his condition. Physical examination: Upon percussing, dullness was found on both sides of chest, except over upper lobe of right lung. Heart area normal. On auscultation, subcrepitant and moist rales were heard. The heart sounds were apparently normal. Pulse weak and rapid. Sputum tenacious and scanty. In spite of vigorous supportive and stimulating treatment the patient rapidly grew worse and died at 9.10 p. m. January 2. Apparently death was due to failure of respiration, as the pulse remained in fair condition up to a short time before death.

Necropsy (fourteen hours and a half after death).—The body is that of a well-developed, well-nourished adult white male. Rigor mortis well marked. Enceph-

alon normal. Weight of brain, 1,450 grams. The pericardial sac contains 150 c. c. of creamy pus. The visceral and parietal layers of the pericardium are thickened and infiltrated with fibrin, serum, and pus. Heart is normal; weight, 380 grams. The pleura at base of left lung shows a few adhesions. Elsewhere the parietal and visceral layers of both pleuræ are covered with fibrin, serum, and pus. The left lung upon section shows the lower lobe to be in a condition of red hepatization; upper lobe partly gray and partly red hepatization; weight, 780 grams. The right lung upon section shows lower lobe to be in a state of red hepatization, while the middle and upper lobes are slightly congested; weight, 460 grams. The peritoneal cavity is normal. The spleen is soft and spongy; weight, 250 grams. Kidneys normal; weight, right, 170 grams; left, 180 grams. The remainder of the genito-urinary organs are normal, with the exception of a well-marked stricture in the spongy portion of the urethra. The liver is normal; weight, 2,300 grams. The intestines are distended with gas. The remainder of the gastro-intestinal tract is normal.

R. R. H.

H. S. M.

J. M. G.

Microscopical report.—Sections made from the consolidated lung show that the air spaces and smaller bronchi are filled with an exudate, which shows signs of degeneration and softening. The white blood cells are granular and do not stain well; no red blood cells may be seen; the pus cells are broken down; joining with the fibrin present, they form conglomerated granular masses which have shrunk away from the walls of the containing air spaces and do not completely fill them. The changes in the walls of the air spaces are slight, and consist only in a swelling of the epithelial cells remaining in situ, alternating with smaller areas where the cells have disappeared. The dilatation of the smaller blood vessels is not marked. The condition of the lung is that, therefore, of gray hepatization, confirming the diagnosis of acute lobar pneumonia.

BRONCHO-PNEUMONIA.

CASE 1.

With abscess and gangrene of the lung.

F. M. C.: aged 19 years; nativity, Maine; admitted to the United States Marine Hospital, Boston, Mass., April 20, 1898; died May 29, 1898.

History.—Two days before admission fell overboard between a log and the dock and, being unable to swim, was nearly drowned. He got much water in his lungs and was revived by artificial respiration. Up to the time of admission he had expectorated clots of blood, and at that time there was tenderness over the ensiform cartilage, and slight jaundice. His bowels were costive throughout. His temperature ran an irregular course, from normal to 39.8°, but with a regular evening rise and morning remission. May 2 a pleuritic friction sound developed on the right side, and a week later on the left also. Friction disappeared from the right side May 7. The other physical signs were those of broncho-pneumonia. The expectoration, at first scanty and blood-streaked, later became purulent, and ten days before his death began to be offensive. From time to time he had coughing spells, which steadily grew more distressing, frequent, and prolonged, the expectoration becoming more and more putrid. It finally became so offensive that he was removed from the ward with the other patients. May 25 he coughed up 300 c. c. of pus, and seemed relieved, his evening temperature going down to normal the next three days. On the 28th another coughing spell brought up 1,000 c. c. of brown, foul pus, but there was extreme

dyspnœa. Passed a very restless night, coughing incessantly and breathing with great difficulty, and on morning of 29th collapsed, but was revived. During this day he coughed up about 500 c. c. of pus of the same character, and dyspnœa increased. Died suddenly at 6.35 p. m. from asphyxia. Appetite good throughout.

Necropsy (twenty hours after death).—Post-mortem lividity and rigor mortis marked; general nourishment good. Heart weighed 280 grams; valves competent and presented no lesion; walls normal; right side engorged with black clot; left ventricle contained a firm pink clot, which extended into the ascending aorta; pericardium contained considerable effusion. Nares full of thin, pus-like fluid. Left lung weighed 1,370 grams; upper lobe on section in state of gray hepatization; bronchioles exuded a frothy mucus; lower lobe in a condition of red hepatization, and covered with a tough exudate; adhesions numerous in upper left pleural sack, and some present in lower portion. Right lung weighed 800 grams; upper lobe normal, but bound by a few firm adhesions; the entire middle and lower lobes honeycombed by an abscess, and, for the most part, in a gangrenous condition; large opening from the lung into the pleural sack, the sack containing 1,500 c. c. of vile-smelling, chocolate-colored pus. Stomach normal, containing a little partially digested milk. Intestines empty, slightly congested, and distended with gas; some feces in the sigmoid flexure. Liver weighed 4,000 grams, and was passively engorged. Pancreas weighed 165 grams. Left kidney weighed 250 grams; was composed of three lobes, and slightly congested, capsule stripping off readily. Right kidney weighed 250 grams, slightly congested, capsule stripping off readily. Bladder normal, containing a few grams of urine. Spleen weighed 440 grams, and was congested. Brain, 1,558 grams, and slightly congested.

H. W. W.

CASE

Measles.

J. H. H.; aged 18 years; nativity, Tennessee; was admitted to the United States Marine Hospital, San Francisco, Cal., June 25, and died June 29, 1898.

History.—Patient was transferred from the general field hospital, United States Army, at the camp near this hospital, and was a recent arrival from his home. He was admitted to the general field hospital on June 18, 1898, with the then prevailing epidemic of measles. Rash broke out June 24, 1898. Bronchitis appeared early and gradually grew worse. On admission here both sides moved equally on respiration. Crepitant râles heard all over the chest. Pulse 100, weak; respiration, 36, superficial; temperature, 40° C. Patient grew steadily worse in spite of all treatment—quinine, expectorants, stimulants, diaphoretics, diuretics, inhalations of oxygen, and hot baths. Patient died during a coughing spell. The temperature the evening of his death was 38.2° C.; pulse, 70; respiration, 50. The mitral tones were clear, but the others were either drowned by the râles or were so weak that they could not be heard clearly.

Necropsy (five hours after death).—Body that of a well-developed and well-nourished young, white, adult male. The skin of face and neck show large livid blotches, with similar patches of small size scattered over the body, and very large patches on back, evidently measles. Small quantity of frothy mucus found in mouth. Lungs presented a mottled appearance, the colors being blue, gray, and red. Lungs distended. Pericardial sac contained about 45 c. c. of clear straw-colored fluid (serous). Pericardium normal in appearance. Heart normal. Coronary veins filled more in the left heart than in the right heart. Consistence of muscle of left heart slightly harder than normal. Right heart soft and fatty. Color pale red. Heart contracted. Amount of fat in the subpericardial tissue is considerable along the auriculo-ventricular border and the base, slight in inter-ventricular groove. Right heart contained some dark gelatinous blood clots;

also a fibrinous clot extending on one side into the ventricle and on the other into the superior vena-cava for about 15 cm. Small pieces of fibrinous clots were picked out from between the columnæ carneæ. Left heart contained a very dark clot, and also a fibrinous clot extending into the pulmonary vein. Left ventricle contained a very small quantity of dark, clotted blood. A small fibrinous clot 4 cm. long extended into the aorta. The wall of left heart was normal in color and firmly contracted. The wall of the right ventricle was thin and composed mostly of fat. The valves of the heart were all normal. A fibrinous clot was incarcerated between the edges of the mitral valves. When the bronchus was cut a free flow of sero-sanguineous fluid containing pus occurred. Weight, right lung, 927 grams; weight of left lung, 785 grams. On palpitation, the right lung is found to be firm; the superior lobe has an area about 5 mm. in diameter, which is especially firm. On section, the lung appears to be grayish throughout, except in some small places, where it is reddish. Thin, frothy, purulent fluid runs over the cut surface as soon as section is made. There are many points where pus is seen very distinctly collected in areas of 2 mm. in diameter. Both lungs are in about the same condition.

No further examination made.

T. B. P.

J. M. G.

CASE 3.

C. K. G.; aged 19 years; nativity, Michigan; was admitted to the United States Marine Hospital, port of San Francisco, Cal., June 23, 1898, and died June 24, 1898.

History.—Patient was one of the United States volunteer soldiers then recently massed at this point, and was admitted to the camp (army) hospital June 14, 1898, suffering with the prevailing epidemic of measles. Broncho-pneumonia supervened June 21, 1898, in the evening. On admission patient was extremely cyanotic. Temperature, 39° C.; pulse, 112, weak; respiration, 52, superficial. Patient raises a thick, tenacious mucus. Bronchial breathing very marked over bases of both lungs. A supportive and revulsive treatment of strychnine and digitalis hypodermatically; mustard paste externally; and spirit minde rev. quinine, and whisky was begun, but without appreciable effect except to relieve the distress of the patient. At 9 p. m. respiration was 57 and pulse 122 to the minute. The dyspnoea became more marked until toward morning, when a period of calm ensued, terminating in death at 5.45 a. m., within twelve hours of his reception.

Necropsy (eight hours after death).—Body that of a muscular, well-nourished young white man. Rigor mortis marked. Pericardium contains 32 c. c. serous fluid. Heart greatly distended and filled with well-organized blood clots extending into the pulmonary arteries and representing casts of them and of the inter-spaces of the columnæ carneæ. Valves normal; weight, 340 grams. Pleural cavities dry. Lungs: Right slightly adherent to diaphragm; weight, 770 grams; engorged. On section filled with red blood and small pus foci. Bronchi coated with thick viscid material, and mucous membrane deep red. Left lung, weight 660 grams, and resembling right lung. No further examination was permitted.

T. B. P.

J. M. G.

ACUTE GASTRITIS. CEREBRAL MENINGITIS.

H. R.; aged 49 years; native of Germany; was admitted to the United States Marine Hospital, Baltimore, Md., February 12, 1898; died February 17, 1898.

History.—Health has always been good until this illness; began drinking heavily February 10, and spree lasted for two days and nights. On admission he had symptoms of acute gastritis: temperature 38.2° C.; complained of severe headache,

loss of appetite, nausea, vomiting, and constipation. For two or three days after admission his condition improved, the temperature fell to normal, and, except for headache and loss of appetite, his condition was good. The night of the 15th he became delirious and attempted to leave the ward. Next morning he was more quiet but still unconscious; temperature 39°; breathing rather deeper than normally; pupils irregularly dilated, the right being the larger; urine passed involuntarily; temperature continued elevated, and patient did not regain consciousness; signs of hypostatic congestion of lungs: blood examination showed marked leucocytosis; respiration became gradually more rapid and pulse weaker and more rapid, and death ensued February 17, 1898.

Necropsy (twelve hours after death).—Body well nourished. Rigor mortis marked. Heart appeared to be normal and pericardium contained a small amount of clear fluid. A few recent adhesions of the lungs to parietes of chest, and one patch adherent to pericardium from middle lobe right lung. Hypostatic congestion of lungs posteriorly most marked at base. Kidneys large, pale in color, and cortical substance appeared thinned. Bladder distended with urine, which gave abundant reaction for albumen. A few drops of purulent fluid found in pelvis of left kidney, but no marked pyelitis. Other abdominal viscera appeared normal. Brain weighed 1,410 grams, and was much congested. All the vessels were full of dark fluid blood, and an effusion in considerable quantity of bloody serum was found in the ventricular cavities. The meninges were markedly congested and an opalescent exudate was present under the pia mater.

C. H. G.

CATARRHAL INFLAMMATION OF INTESTINES.

M. B.; aged 39 years; nativity, Ireland; admitted to the United States Marine Hospital, St. Louis, Mo., June 20, 1898; died June 21, 1898.

History.—When the patient came to the hospital he was in a very weak condition. He stated that he had had diarrhea for two weeks, but had kept on working until four days ago. He had also had headache, cramps in his stomach, and pains all over his body. He had drank considerable whisky to relieve his pain. For the last two days he had suffered from vomiting and purging, and this continued for two hours after arrival here, the vomited matter and feces being thin, watery, and of a yellowish-brown color, the feces having an extremely offensive odor. Physical examination: Marked tenderness on pressure over the transverse and descending colon, profuse perspiration present over his whole body, hands and feet cold and clammy, face pale, breath foul, conjunctiva clear, pulse feeble, 130 to the minute, temperature 36.1° C., respirations sighing, 36 to the minute. Complains of great thirst. Examination of chest difficult, but nothing abnormal noticed except that the respiratory movements are much freer on the right side than the left. No urine was passed while he was in the hospital. Stimulants were given hypodermatically to the patient. Hot applications were applied and normal salt solution was used both by hypodermoclysis and by hot rectal injections, but all to no purpose, as he died eighteen hours after admission in an unconscious condition.

Necropsy (seven hours after death).—Height, 169½ cm. Rigor mortis well marked; posterior portions of body of a reddish-blue color. Body well developed and well nourished. Abdominal wall 2 cm. thick, contains yellowish fat; small intestines reddish-gray color; large intestine dark-gray color. Only 5 c. c. straw-colored fluid found in pericardial sack. Heart tissue soft. Great vessels filled with dark semifluid blood. Heart 16 by 12 by 6 cm.; weight, 350 grams; right ventricle wall one-half cm. thick, contains semifluid dark blood; valves normal; left ventricle wall 1 cm. thick, contents same as right ventricle; valves normal. Right lung 27 cm. by 17 cm.; weight, 325 grams; soft, crepitant, mottled-gray

color, tissue normal. Left lung bound down posteriorly and below to side of chest, and diaphragm 21 cm. by 14 cm.; weight, 388 grams; tissue same as right lung. Spleen $12\frac{1}{2}$ by $7\frac{1}{2}$ cm.; weight, 150 grams; slate color, upon section tissue dark brown with minute dark gray spots. Left kidney 12 by 8 by 5 cm.; weight, 150 grams; capsule nonadherent; tissue normal. Right kidney 12 by 8 by 5 cm.; weight, 150 grams; capsule nonadherent; a few drops of pus found in pelvis; mucous membrane of pelvis dark gray in color, rest of kidney in good condition. Bladder empty. Stomach 26 by 11 cm., contains 20 c. c. yellowish-brown liquid, very offensive odor. Mucous membrane pale with minute red spots, covered with yellowish mucus. Rugæ of stomach dark-red color. Mucous membrane of duodenum has the same appearance as the stomach. Mucous membrane of lower part of ileum light-purple color, no elevation or ulceration of Peyer's patches. Large intestine filled with a foul-smelling, yellowish-brown fluid, mucous membrane pale, congested in places. Vermiform appendix 8 cm. long, size of a goose quill. Liver 30 by 20 by 8 cm.: tissue on section of a reddish-brown color.

W. G. S.

ACUTE TYPHLITIS.

J. D.: aged 19 years; nativity, Michigan; was admitted to the United States Marine Hospital, Detroit, Mich., October 10, 1897, and died October 23, 1897.

History.—Last summer he had an attack of appendicitis. On Friday, October 8, he was seized with severe pain in his abdomen; he slept well Friday night. On the 9th drank a liter of whisky undiluted. On the 10th the pain was again very severe and was not confined to any particular part of the abdomen. There was tenderness to pressure over the whole abdomen. He was troubled with nausea and vomiting whenever he took anything into his stomach, even when he took water, or milk and linewater. Under treatment the pain disappeared, but the tenderness remained and seemed more marked over the region of the appendix vermiformis. October 16 was operated on for appendicitis. When the peritoneum was incised about 800 c. c. of foul pus escaped. The appendix, which was perforated, was removed, and the opening into cæcum closed, as well as that into the abdomen. A drainage tube was inserted and the abdominal cavity irrigated with 3,000 c. c. of sterilized water. The patient did well, having no fever, nor was there any discharge of pus after the abdomen was irrigated. There was great difficulty in retaining any food by the stomach. He was given nutrient enemata, which he retained for the most part.

October 21.—There was a slight rise of temperature, which declined as soon as the abdominal cavity was irrigated. A small amount of fluid escaped. On the 23d, at 9.30 p. m., he seemed in fairly good condition; at 11.15 p. m. was found pulseless, his extremities cold and wet, with profuse perspiration; in a few moments he was dead.

Necropsy (forty hours after death).—Body well nourished, that of a man 1.65 m. tall, and weight about 65 kilos. There were no scars on his body. The abdomen was tense and livid. Decomposition was already begun. There was an incision into the abdominal cavity about 6 cm. long. The wound was in good condition. The abdominal cavity contained considerable gas. The omentum was thickened and gray in color. The portion of the omentum that was in the right iliac fossa was about 2 cm. thick and of a grayish color. The intestines were not discolored with gas. There was no pus in the abdominal cavity. The intestines in the right iliac fossa were adherent to one another, but the adhesions were easily broken. There were no flocculi of lymph in the abdominal cavity. The opening from the cæcum into the vermiform appendix was obliterated, nor was there a trace of the appendix remaining. The cæcum, on its numerous surfaces, was smooth. The stomach and duodenum were inflamed. The mucous membrane of the duo-

denum was intensely inflamed and its surface covered with mucus, which could only be removed by the finger. The stomach was inflamed in many places near the pylorus and along the greater curvature there were hæmorrhages beneath the mucous membrane. These patches were 5 cm. in diameter and some smaller. In the right iliac fossa there were the remains of a pus cavity; the inner walls formed by the lymph attaching the coil of small intestine to the abdominal wall. Spleen small, soft, and weighed 80 grams. Liver normal in size, pale, and friable; weighed 1,600 grams. Kidneys pale, small, and cortical portion thinner than normal; weight of each, 140 grams. Lungs normal; right weighed 500 and left 350 grams. Heart normal; it contained ante-mortem clot. Brain normal; weighed 1,450 grams. Bladder normal; contained about 75 c. c. fluid.

C. T. P.

J. G.

HERNIA, INGUINAL, STRANGULATED—ACUTE PERITONITIS.

S. B.: aged 36 years; nativity. Canada; admitted to United States Marine Hospital, Cleveland, Ohio, February 5, 1898; died February 8, 1898.

History.—Family history negative; had an inguinal hernia on the left side for the past twenty-five years, but has never worn a truss. Five days ago (Monday, January 31) it came down and he was unable to reduce it. The next day he had nausea and vomiting, and has been unable to retain anything in his stomach from then until Saturday evening, February 5, when he applied for relief, and was admitted to hospital at 6 p. m. A large irreducible scrotal hernia was found on the left side; he had much nausea and vomiting, and the vomited matters have a slight fæcal odor. The bowels are constipated since the hernia came down; there is marked tympanites; general abdominal tenderness and no elevation of pulse or temperature. He was prepared and operated on at once. Under anæsthesia the sac was exposed by an incision over the line of the inguinal canal, and a firm constriction found at the outer ring. This was divided, the sac separated by blunt dissection, and opened, when about 50 c. c. of serous fluid escaped. The sac was occupied by a coil of large intestine (part of the descending colon), and carried with it the appendices epiploicæ, which were greatly swollen and formed the chief obstacle to the reduction of the hernia. The bowel was constricted by bands of adhesive material where the two extremities of the loop passed through the external ring, and beyond on the distal side it was very dark in color, but not apparently dead. The bands were divided and the bowel returned to the abdomen; the sac ligated and excised, and the pillars of the ring closed by metallic sutures. Iodoform gauze for drainage and skin sutures of silkworm gut completed the operation. The usual sterilized dressing was applied and the patient removed to the surgical ward.

February 6.—Had a fair night. At 2 a. m. he had a copious, thin, dark stool, and between that time and 6 a. m. he had four evacuations from the bowels. Morning temperature, 37.4° C.; pulse, 80; marked tympanites and tenderness over abdomen. Had two more stools during the day. Evening temperature, 37.8° C.; pulse, 94. Still nauseated.

February 7.—Morning temperature, 37.6° C.; pulse, 90; tympanites, abdominal tenderness, and nausea. Drain removed, which permitted the escape of considerable gas, which relieved him to some extent. Evening temperature, 37.8° C.; pulse, 98.

February 8.—Morning temperature, 37.4° C.; pulse, 102; tympanites marked; much pain over abdomen; nausea and vomiting, and he is evidently sinking. Wound washed and irrigated with warm Thiersch's solution. Died at 7.10 p. m.

Necropsy (fourteen hours after death).—Body large and well nourished. Cadaveric rigidity present. Brain not examined. Chest: No pleuriti adhesions; peri-

cardial sac contains normal amount of fluid. Heart large; valves all healthy. Left lung shows cicatrices at apex and caseous nodules; remainder of lung crepitant. Right lung shows a patch of emphysema or distended vesicles at apex; hypostatic congestion present in both lungs. Abdomen much distended. Liver large and fatty; gall bladder moderately distended; ducts patulous, and no calculi found. Stomach distended and mucous membrane congested. Pancreas normal. Peritoneum inflamed throughout, involving both visceral and parietal layers; large intestine greatly distended by gas. Part of the descending colon and sigmoid flexure, which were involved in the hernial protrusion, discolored but not dead; epiploic appendages much enlarged, and it is evident that the bowel has suffered from its prolonged constriction of five days. Wound in abdomen united, except where gauze drain was inserted. Right kidney shows a few retention cysts on surface; left kidney, bladder, and ureters normal. Peritonitis evidently existed in this case before admission to hospital, and but for this complication his chances of recovery were good. The resistance of the large bowel to prolonged constriction (five days) was well shown in this case.

D. A. C.

CIRRHOSIS OF LIVER.

CASE 1.

E. M.; aged 52; nativity, Maryland; admitted to United States Marine Hospital, Baltimore, Md., October 9, 1897; died November 17, 1897.

History.—Patient was in this hospital in June, 1895, with organic stricture of the urethra and retention of urine. When last admitted he gave the history of gonorrhea and sore on penis some years previous, but stated that he had usually enjoyed good health. Admitted that he had been a hard drinker, but of recent years had been more temperate. On admission he complained of dyspnea on least exertion. There was considerable œdema of the lower extremities, and a puffy condition about the eyes. Micturition frequent, necessitating his getting up several times during the night, but the quantity passed in twenty-four hours was less than normal. Specific gravity of urine 1.010; but examination showed it to contain no albumen. Bowels constipated; temperature 37° C.; pulse 88. The heart sounds were normal, save some accentuation of second aortic sound, and little or no dislocation of the apex beat. Examination of the liver and spleen showed the former to be rather small, while the latter was considerably enlarged. Arteries markedly atheromatous. Laxatives and diuretics were administered, and for a time his condition improved.

October 23.—Temperature 39° C.; pulse 100. Patient in a semiconscious condition. Hands tremulous, and he is unable to speak. Pupils dilated, but equal. This condition gradually improved, and in two or three days he was about as usual.

November 12.—Patient suffered another attack similar to the previous one. For several days prior to death the temperature ranged between 38° C. and 39° C., the morning register being slightly lower than the evening. Pulse about 100 and quite full. Urine and feces passed in bed. Patient lapsed into total unconsciousness, and gradually grew weaker until November 17, 1897, when death occurred.

Necropsy (ten hours after death).—Rigor mortis marked. Body that of a white male and somewhat emaciated. Pericardium contained about 50 c. c. of straw-colored fluid. Heart weighed 280 grams and was apparently normal. Valves normal. Pleuræ were normal, save some slight adhesions at right apex. Right lung weighed 770 grams; left weighed 785 grams; both intensely congested. Liver weighed 945 grams; firm to the touch, hard, and presented on its surface a granular appearance. It was resistant to the knife, and sections presented all the

macroscopical appearances of cirrhotic liver. Spleen weighed 920 grams; enlarged, soft, and friable. Left kidney weighed 155 grams; right kidney, 125 grams. Capsules easily separable. On section, dark in color and cortex was reduced. Stomach and intestines apparently normal. Gall bladder moderately distended, with a very dark colored and viscid fluid. Urinary bladder contained about 150 c. c. of highly colored urine. The walls of the bladder showed evidence of a chronic cystitis. In the bulbo-membranous portion of the urethra was found a stricture of small caliber. Brain weighed 1,155 grams. When the calvarium was removed about 250 c. c. of fluid blood escaped. The meninges were congested and showed evidence of considerable inflammation. The ventricles contained some fluid. The brain substance was normal, save some congestion, as shown by numerous puncta vasculosa.

J. McM.
G. P.

CASE 2.

Ascites.

W. M.; aged 42 years; nativity, Pennsylvania; admitted to the United States Marine Hospital, Stapleton, N. Y., December 17, 1897; died January 9, 1898.

History.—Had had malaria three months ago, and sores on his penis twenty years ago. He was a moderate drinker, smoked and chewed tobacco. Two weeks before admission he noticed his abdomen beginning to swell, and a week later his extremities began to "swell and pit." He said he felt perfectly well, but had lost his appetite and had "heartburn." On admission patient's abdomen was swollen and full of fluid, and his extremities were oedematous. The lungs were normal. There was accentuation of the second aortic sound. His liver could not be palpated, but seemed small. His breath was foul, and he said he was troubled with eructations, and passed but little urine. Urine, specific gravity, 1.024; no casts, no odor, acid, no albumen, some amorphous urates. Patient had piles. On the 25th he was aspirated and 1,000 c. c. of a fluid containing albumen withdrawn.

Specific gravity, 1.010; reaction alkaline, transparent, yellow. Fluid escaped from the opening and rendered a second paracentesis unnecessary. About the 24th the patient began to complain of some pain in his belly, and he steadily grew worse, losing his appetite and vomiting after ingestion of food. On the 8th his bowels moved freely—involuntarily—several times, but he felt well and seemed stronger. The following morning his pulse became very weak; he had large involuntary discharges of urine and feces, and he died January 9, 1898. His temperature was normal throughout.

Necropsy (thirty hours after death).—Body emaciated; rigor mortis and post-mortem lividity marked; pupils dilated; abdomen slightly lax; extremities oedematous. The abdominal cavity contained 4,000 c. c. of a yellow fluid similar to that above described. The peritoneum was opaque, thickened, and of a dirty-gray color. The greater omentum was yellow in color, and consisted of a stringy mass adherent to the anterior abdominal wall and the intestines. The latter were dilated with gas, save a portion about 1 meter long, beginning 2 meters from the stomach. This portion was constricted to 2 cm. in diameter. About the middle of this portion was a cone-shaped diverticulum, whose length was 7 cm. and base 2.5 cm. The liver weighed 1,510 grams and was rather small. Its surface was studded with granules or "hobnails" about 1 cm. in diameter. The capsule was somewhat thickened, and upon section the tissue grated and was tough and leathery. The section felt not unlike wet leather. Bands of connective tissue could be seen, but the color of the tissue was not notably abnormal between the bands. The kidneys were small and the capsule adherent. The left one weighed

140 grams, the right one 150 grams. The pelvis of the kidney was relatively very large, the cortical portion very small, and the medullary portion normal. The stomach was empty, rather small, and its walls were thickened, varicose veins being noticed within its walls. The spleen was large, weighing 290 grams, and was nearly quadrilateral in shape. The bladder and other genito-urinary organs were normal, the former being empty. Unavoidable circumstances prevented a further examination.

H. S. C.

G. W. S.

CASE 3.

Rupture of a deep branch of superior mesenteric vein.

J. Y.; aged 25 years; nativity, Pennsylvania: admitted to United States Marine Hospital, Cleveland, Ohio, August 13, 1897; died October 16, 1897.

History.—Father died from cancer of the stomach: family history otherwise negative. He has always drunk freely of alcoholic liquors. In June, 1897, he had an attack of jaundice with some swelling and tenderness on pressure over the pyloric region. He has never had much nausea or morning vomiting, but at times he was troubled with diarrhœa, and again he suffered from constipation. When admitted to hospital he was fairly nourished, skin icteric, lungs and heart normal, liver much enlarged, tender on pressure, and easily palpable. Urine contains bile pigment and his stools are clay-colored. Diagnosis: Cirrhosis of the liver in hypertrophic stage. Under treatment he improved slightly, but seemed to suffer from mental depression and seemed to think he had a tumor in the pyloric region, and he earnestly asked that an exploratory operation be done to decide the matter. On October 14, under anæsthesia and with the usual precautions, an exploratory incision was made and the gall bladder, cystic and common ducts, the surface of the liver, and pylorus examined with the finger, but nothing was found except a cirrhotic liver. He took the anæsthetic badly and vomited with great straining several times during the operation, and this may have had some relation to the fatal result. The wound was closed and dressed in the usual manner.

October 15.—Slight tenderness over wound: temperature 37.5° C.: pulse 94, and weak.

October 16.—During the night his pulse failed rapidly, the abdomen became distended, and soon went into collapse, dying at 11 a. m.

Necropsy (three hours post-mortem).—Skin icteric: rigor mortis absent: abdomen distended and tympanitic. Brain not examined. Chest: Heart normal and in systole; valves all competent; slight atheromatous patches in ascending wall of thoracic aorta. Muscular structure of ventricles bile-stained. Pericardium normal. Firm and extensive pleuritic adhesions on right side of chest, none on left side. Right lung slightly cirrhotic at apex, otherwise normal. Left lung congested. Abdomen: Cavity full of blood, clotted and liquid. Operation wound in right umbilical region partly united and slight localized peritonitis around it. The source of the hemorrhage was traced to a dilated vein, a deep branch of the superior mesenteric, which had given way. There were also numerous bloody points in the omentum, from which blood had issued. These points were well away from the operation wound and path of exploration and did not seem to have any connection with them. It is probable that the vein which gave way may have been dilated or varicose, resembling enlarged œsophageal veins, which by their rupture sometimes cause death by hemorrhage in cirrhosis of the liver, and that the rupture may have been induced or hastened by the struggle of the patient under the anæsthetic already noted. No adhesions were found during the exploration, and therefore none were torn. Stomach dilated and marked by chronic

gastritis. Liver very large, deeply bile-stained, and cuts firmly on section. Gall bladder distended with bile ducts patulous, and no calculi were found. Spleen congested. Intestines present nothing abnormal. Kidneys congested. Slight stricture in bulbous portion of urethra. Bladder healthy. Sections of the liver, lung, and kidney under the microscope show cirrhotic changes, most marked in the liver.

D. A. C.

CASE 4.

Cirrhosis of liver—Hypertrophic.

T. L.; aged 42 years; nativity, Maryland; was admitted to United States Marine Hospital, Detroit, Mich., November 22, 1897; died January 3, 1898.

History.—Nine years ago had his jaw broken; was treated in San Francisco; has been a hard drinker all his life; denied venereal history. About one week before entering hospital he was taken with a pain in his abdomen; his bowels were quite loose, having five or six stools in two hours; two days later his feet began to swell; the swelling began about the ankles first; then he began to have pains in his back, which was lancinating in character; nausea and sometimes vomiting; urinates freely and often; there is dyspnoea upon the slightest exertion; appetite variable; bowels irregular; no albumen; has some gastric dilatation; slight ascites; liver seems contracted; anasarca without albumen, together with the well-known skin odor and putty feel, indicates cirrhosis. December 3, the ascites has gradually increased and there is dullness over whole of left lung, with bronchial breathing; increased vesicular murmur on right side with some moist râles. The scrotum was tapped several times. The pleural and abdominal cavities gradually filled up, and there was general anasarca. He died of collapse.

Necropsy (eighteen hours after death).—The calvarium removed. There is considerable subdural fluid. The dura is very firmly adhered to calvarium. The sinuses and blood vessels are engorged. Brain tissue firm. Velum thickened. Fluid in the ventricles. Pureal gland enlarged and soft. Thorax flat on percussion on left side. When opened it was found that the left lung was collapsed and squeezed into a ball not much larger than the fist. So much of the fluid has escaped that no attempt will be made to collect and measure it. Right lung congested. Pericardium contained 50 c. c. fluid. Heart normal. The great blood vessels normal. The abdomen is distended with fluid. Spleen weighs 350 grams and is very soft. Right kidney very much congested and weighs 280 grams. Left kidney larger than the right and also congested; weight, 310 grams. The adrenals were enlarged and adherent to the capsules. Kidney capsules adherent to kidney substance. The organs of generation are normal. The rectum, duodenum, stomach, mesentery, small and large intestines were normal. The liver is very much enlarged and congested, of the hobnail variety. It weighs 2,420 grams. Gall bladder distended with pale, straw-colored bile. The head of the pancreas is hard and thick.

J. O. C.

J. G.

CASE 4.

Hypertrophic.

T. C.; aged 64 years; nativity, Ireland; admitted to the United States Marine Hospital, port of New York, October 13, 1897; died March 2, 1898.

History.—Patient was a well-built, fairly nourished man about 170 cm. in height; weight, 60 kilos. Upon admission patient said that he had never been sick in his life until about two weeks previous when his present trouble was first noticed. He had jaundice, his skin was dry and scaly, of a lemon hue, his conjunctivæ yellow. He had no appetite, complained of dull epigastric pain after eating, xanthropsia

and pruritis, and said his linen was stained yellow by sweat. Urine was highly colored, and bowels were regular. Examination of liver showed no enlargement. The apex beat was a little low, and out over the præcordium a soft systolic blowing murmur could be heard—loudest at the apex. Milk diet and phosphate of sodium were prescribed, and the diet was persisted in with necessary but short intermissions throughout. Diagnosis of catarrh of the bile ducts was made. The liver gradually became larger until it reached the umbilicus, but did not seem rough; the border was sharp. After a few days the stools became normal in color and slightly loose. Iodide of potassium was exhibited with the milk diet. There was no ascites at any time and only a slight œdema in the feet. Hemorrhoids were not large and troubled him little. In spite of every treatment the jaundice became worse and more intense until death, when he was a deep golden brown. The only subjective symptoms at any time were mental hebetude, slight pain in epigastrium after eating, tenderness over liver, anorexia with thirst and the pruritis. No sugar; slight traces of albumen and large quantities of biliary coloring matter were detected in the urine. March 2, at noon, he fainted while walking, seemed to recover, fell into a stupor, and died at 8 p. m.

Necropsy (thirty-eight hours after death).—Body that of a man about 170 cm. in height; weight, 50 kilos. Post-mortem rigidity marked. The whole body is of a deep-yellow jaundiced color, the face dark bronze. Fairly muscular in appearance, eyes jaundiced pupils 1 cm. in diameter. Upon removing the calvarium the membranes were found yellow in color, the brain normal in consistence, color, and weight. Upon opening the pleural and abdominal cavities the subcutaneous tissue was found to be yellow. The pleural cavities contained about 10 c. c. of normal fluid. The lungs were perfectly free from adhesions and were sound, save a slight congestion with accompanying red color. Right lung, 650 grams; left lung, 525 grams. The pericardium contained about 50 c. c. of yellow fluid. The heart weighed 310 grams. There was mitral insufficiency, one of the leaflets being crumpled and bound down. The tricuspid valve seemed competent, but contained vegetations upon one leaflet. The liver weighed 2,260 grams; its shape was normal, the anterior border being sharp and not notched. Its surface was smooth and yellowish. Upon section the right lobe was found to cut much like hot tough bread or wet leather, but not as in an old atrophic liver. The color was a yellow gray, much lighter than normal; no bands of connective tissue seen with unaided eye. The left lobe was normal in color and consistence. Gall bladder contained 120 c. c. of dark fluid. Microscopic examination: Kidneys showed no form of nephritis, but a very marked congestion, clusters of red blood cells being quite numerous. Liver: The capillary bile passages could be seen to be considerably dilated and encroaching on the liver cells; surrounding the interlobular vessels was a marked increase in connective tissue, and there seemed to be some degeneration of the liver cells surrounding the connective tissue. The stomach was normal in size and in fair condition. The common bile duct was patent. The pancreas weighed 125 grams, and nothing abnormal was noted about it or the suprarenal capsules. The right kidney weighed 170 grams and seemed congested; the left weighed 160 grams. The right ureter, about 10 cm. from the kidney, expanded into a fusiform dilatation 2 cm. in diameter. The bladder was empty and contracted. The intestinal tract was normal.

H. S. C.

G. W. S.

PERITONITIS—LAPAROTOMY—DEATH.

J. G.; aged 37 years; nativity, Ireland; admitted to marine ward, German Hospital, Philadelphia, Pa., March 3, 1898; died March 28, 1898.

History.—Father and mother died of old age. One sister died during confinement. Two sisters living and well. Has used tobacco and alcohol to excess for

at least seventeen years. About ten years ago had a sore on his penis, which gave no rise to traceable specific symptoms. He took immediately what was presumably specific treatment, and no manifestations of specific disease made themselves apparent up to the present time. Does not remember having had any of the diseases of childhood. Has always considered himself a healthy man. On January 1, 1898, had sexual intercourse, six days after which appeared a profuse creamy discharge from the orifice of the urethra. This discharge disappeared three weeks ago, upon the cessation of which he commenced having a feeling of general malaise, anorexia, and constipation. Had chilly sensations not followed by fever or sweat or marked by any certain periodicity. The past two weeks has felt cold, being unable to get warm. One week ago the urethra discharge reappeared. On admission: Temperature, 37° C.; pulse, 88, good volume. Tongue was slightly coated with yellowish-white fur, and moist. Abdomen was soft, no gurgling or tenderness; spleen not enlarged. On examination of urethra a discharge was found, sero-purulent in character; no glandular enlargement was observed. Heart: Apex beat in the fifth interspace about $2\frac{1}{2}$ cm. to inner side of mamillary line. No murmurs were detected at point of maximum intensity. Lungs: Physical signs negative. Urine: Reaction acid; specific gravity, 1.030; faint trace albumen; some leucocytes and epithelial cells found. Blood: Examined for malarial organisms; not found. March 3 and 9 was examined for Widal's reaction by city board of health and German Hospital laboratory; result negative. Three days after admission sudden, sharp, acute pain in right iliac fossa; symptoms of general peritonitis soon manifested themselves. Operation was not deemed advisable until one week later, when incision was made in median line and abscess cavity was evacuated. The next day a fecal fistula appeared. Two days later it closed and patient grew steadily worse. Temperature ranged from 38 to 40° C throughout attack.

Necropsy.—Height, 5 feet 8 inches. Post-mortem lividity not marked; rigor mortis moderate; subject very much emaciated; pupils dilated. Heart weighed after opening 300 grams. Pericardial sac was normal. Aortic and pulmonary valves were found competent by the hydrostatic test. Mitral and tricuspid valves showed no pathological change. Left ventricle contained chicken-fat clot, which protruded into the auricle. The right ventricle contained chicken-fat clots, which was entangled in the chorda tympanæ. The usual proportion, 4 to 1, as to thickness of walls was maintained between the right and left ventricles. The cavities were all normal in size. The ascending arch of the thoracic aorta showed a few specks of atheromatous change; no changes were noted in the rest of the artery. The abdominal aorta was found normal throughout. Nothing abnormal about other arteries and veins was observed. The nares were found normal. Nothing abnormal was found in larynx or trachea. The left lung weighed 430 grams; posteriorly and at the bases hypostatic congestion was observed. The left pleural cavity was entirely free of adhesions. The right lung weighed 440 grams. The right pleural cavity was filled with purulent fluid, which extended about the height of fourth rib. The walls of pleural cavity were much thickened and covered by pyogenic membranes. The cavity was firmly bound down by adhesions posteriorly, but the lung was in no way connected with the pyo-thorax. The right lung showed same pathological change as the left. The peri-bronchial glands were much enlarged and had undergone calcareous change. The area which covered the incision made in recent operation was dark and gangrenous in appearance. To the left of the median line and below the umbilicus the peritoneum was firmly adherent to the anterior belly wall. Directly beneath this area was found a cavity formed by recent adhesions, peritoneum, and knuckles of gut, in which there were about 100 c. c. of pus. In the right iliac fossa toward the median line there was a similar cavity containing about 60 c. c. of pus, and anterior to the upper portion of the rectum there was another similar cavity.

Throughout the abdominal cavity many smaller such cavities were found, which contained a few cubic centimeters of pus. The tongue was coated with a brownish fur. The pharynx was found normal. The œsophagus was found patulous throughout: no abnormal changes had taken place. The stomach was very large and deeply congested, and contained a small amount of caseous material. The diameter of the cardiac orifice was $2\frac{1}{2}$ cm., and that of the pyloric orifice was $1\frac{1}{2}$ cm. An opening was found about 15 cm. in the ileum above the cæcum: this portion of the intestine was situated below the incision made by the operation, and was in the median line. In situ the opening had become closed, by a knuckle of gut, to its margins by recent adhesions, which were easily torn away. The opening was about 1 cm. in diameter: the edges were rounded and infiltrated. A plastic lymph was also found around the margins.

In the ileum, about 15 cm. above the cæcum, there was an ulcer whose base was smooth and formed by the peritoneal coat. The appendix vermiformis was about 12 cm. in length and of about the normal caliber. On longitudinal section it was found patulous throughout, no constrictions being observed. It contained a few small fecal masses which were readily movable. The entire gross appearance of the organ was normal. The rectum was found patulous throughout, with three longitudinal bands somewhat thickened. The liver appeared to be somewhat smaller than normal. It weighed 1,360 grams and was bluish purple in appearance. The portion of the liver next to the diaphragm was found firmly adherent, and a well-formed pyogenic membrane was found throughout this area. This membrane involved only the liver capsule, the liver structure not being involved. Upon section the liver was hard and resistant and had all the appearance of cirrhotic change. The gall bladder and ducts were found normal throughout. The pancreas weighed 150 grams and appeared to be somewhat softened. The left kidney weighed 210 grams. Pus was found in the pelvis and calices of the organ. There was some congestion present. The cortical portion was somewhat swollen and contained many minute areas of hemorrhagic changes. The general appearance of the organ resembled that in acute nephritis. The right kidney weighed 210 grams and presented the same general changes as the left. The pelvis and ureters were apparently normal. The bladder was very small: the walls were much thickened and its interior was ribbed. The urethra showed no signs of stricture and was apparently normal throughout. The prostate gland was not enlarged. Suprarenal bodies: The left weighed 8 grams and showed no macroscopical changes; the right weighed 10 grams; apparently normal. Spleen: Weight, 160 grams; very soft, pultaceous, and tears easily, being almost of consistency of thick apple butter. The scalp was covered by a sparse growth of hair. In the median line, near where the parietal joins the occipital, there was a depression in the skull, a very small organized tumor fitting in this space, apparently being an organized hæmatoma. The membranes of the brain were congested. The cerebral fluid was somewhat cloudy. On the left side a vein on the surface of occipital lobe, which crossed transversely, contained an air or gaseous embolus, on either side of which there was blood, the vein apparently not being punctured anywhere. The brain weighed 1,360 grams and showed no gross pathological changes. Cause of death: Purulent peritonitis, which was probably due to a perforating ulcer of the ileum.

F. I.

ACUTE NEPHRITIS.

J. C.: aged 26; nativity, Massachusetts; was admitted to the United States Marine Hospital, Boston, Mass., October 22, 1897; died December 8, 1897, at 2.30 a. m.

History.—For several years he had been a free drinker. For the past three months he had been subject to frequent attacks of asthma, which were some-

times brought on by exertion. When admitted to the hospital for treatment his lower limbs were very œdematous, pitting deeply on pressure. The heart was rapid and forcible, with high arterial tension. Respiration was accelerated and labored and all over both lungs were heard loud moist râles. He was somewhat constipated. His skin was very white and transparent. Urinalysis revealed a low specific gravity, the presence of albumen in the proportion of 30 per cent by volume. There were granular casts, pus corpuscles, red-blood cells, and kidney débris. Under treatment there was transient improvement, the lung symptoms modifying somewhat. On November 24 the amount of albumen increased to 60 per cent by volume. On December 5 the œdema of the lungs was much increased and uræmic coma set in. From this time until his death on the 8th of December he was unconscious, the uræmia and œdema rapidly becoming worse and the heart feeble. During the last two days it became necessary to catheterize him.

Necropsy (eleven hours after death).—General nourishment good; post-mortem lividity slight; rigor mortis marked; pupils dilated. The heart weighed 510 grams, and was much hypertrophied. The left ventricular wall was 3 cm. thick; the right ventricle and auricle showed fatty degeneration and their walls were much thinned. In the left ventricle was a small ante-mortem clot. All the valves were competent, but on the lower surface of the posterior cusp of the mitral valve was a vegetation about 1 cm. in length. The pericardial sac contained 90 c. c. of clear serum. The left lung weighed 900 grams. On section it was congested throughout both lobes, was filled with fluid, and was œdematous. Its pleural cavity was obliterated completely by fibrous adhesions. The right lung weighed 1,160 grams. The lower lobe was markedly congested, the upper lobe slightly so, and was much pigmented. The whole lung was œdematous and filled with fluid, while in the upper lobe there was some emphysema. Its pleural cavity was normal. The peritoneal cavity was distended with serum and the great omentum contained a large deposit of fat. No pathological changes could be found in the intestinal tract. The liver weighed 2,500 grams and was normal in color. It was unusually large and on section showed evidence of an excessive amount of connective tissue. It was passively congested throughout. The gall bladder contained 28 c. c. of bile. The pancreas weighed 75 grams and was normal. The left kidney weighed 310 grams. The right kidney weighed 280 grams. The capsule stripped readily from each. On section they were markedly congested and the capillaries were prominent. The pelves and ureters were normal. The urinary bladder contained 25 c. c. of urine. It was normal, as were also the urethra and prostate. The suprarenal bodies were normal. The spleen weighed 510 grams. It was soft and friable. The membranes of the brain were congested. The brain weighed 1,517 grams. Its vessels were somewhat congested, but otherwise it was normal.

H. W. W.

H. W. A.

CHRONIC NEPHRITIS—VALVULAR DISEASE OF HEART (MITRAL).

CASE 1.

L. W. H.; aged 58 years; nativity, Connecticut; admitted to United States Marine Hospital, New York, May 29, 1897; died March 11, 1898.

History.—Transferred from New London, Conn. Family history good. Patient was well till six weeks before admission, when he began to have palpitation of heart and dyspnoea, and four weeks later nausea and vomiting, loss of appetite, œdema of legs, and fullness in abdomen. On admission examination showed dullness at lower part of chest behind, with crepitant and subcrepitant and moist râles. Heart very irregular and somewhat rapid; mitral regurgitant murmur.

Heart slightly enlarged; cedema of legs, worse in the evening; arteries tense and thickened. Urine: Specific gravity, 1010; quantity sufficient; albumen present in considerable quantities; hyaline and granular casts. After admission above symptoms continued with intermission and exacerbations. Steady loss of flesh and strength and increasing cedema. Two months before death examination showed heart very much hypertrophied and dilated, extending beyond mammary line and upward to third rib. Systolic murmur at apex; action weak, rapid, and irregular; arteries very much thickened; urine began to become scanty, until there was almost complete anuria, and during the last week extreme cedema of legs and right arm, extreme prostration, dyspnoea, and nausea.

Necropsy (forty-eight hours after death)—limited to abdominal and thoracic cavities).—No marks of violence: marked general cedema, especially of the right arm, forearm and hand, abdomen, scrotum, and legs; no rigor mortis; marked paraphymosis; 6,000 c. c. clear amber fluid in abdominal cavity; about 400 c. c. clear fluid in pericardium and 1,000 c. c. in each pleural cavity; all tissues cedematous, gelatinous, and exuding fluid on section. Heart very large, of dark-red color; weight, 580 grams. Aorta very atheromatous; mitral and tricuspid valves slightly incompetent; wall thick, pale, and flabby. No marked evidence of fatty change. Ulcer (superficial) size of a dime in left ventricle near apex. Lungs retracted, with many adhesions to chest wall; congested and very cedematous; right weighed 1,248 grams; left weighed 1,060 grams. Liver retracted; no adhesions; liver substance tough and fibrous, of mottled, "nutmeg" appearance, with visible bands of connective tissue. Microscopic section, cells contracted, marked increase of connective tissue, especially about blood vessels and in bands; some dilatation of capillaries in center of lobules. Kidney: Right, capsule and surrounding tissue cedematous, gelatinous, and adherent; some decrease in size, red, and mottled; on section shows markings distinctly with increase of connective tissue and thickened arteries; weight, 190 grams. Left, same, red-mottled variety, with distinct lobulations; two small cysts near the surface containing thick red fluid; same connective-tissue changes as in right kidney, but more marked; weight, 210 grams. Microscopic section shows increase of connective tissue in capsule of Bowman and in stroma, with atrophy and degeneration of cells of tubules. Suprarenal capsules were normal; ureters and urinary bladder were normal. Spleen very small and hard; on section connective-tissue markings very distinct; weight, 55 grams. Microscopic section shows connective-tissue bands dividing stroma into distinct lobules and almost replacing cells. Stomach normal size; showed changes of chronic gastritis. Intestines apparently normal. Pancreas cedematous and disintegrating.

S. B. G.
G. W. S.

CASE 2.

O. J.; aged 32; nativity, Sweden: was admitted to the United States Marine Hospital, Stapleton, N. Y., October 16; died December 17, 1897.

History.—Denies syphilis. Was first sick about six months ago, when he noticed cedema of the lower extremities, dyspnoea, and scant, highly colored urine; no pain. After four weeks in hospital he improved and returned to work. Present condition: Strong, well-built man; lower part of his body and lower limbs are cedematous. Some phimosis. Breath offensive. Heart action good, pulse full, apex beat displaced upward and outward. Some fluid in each pleural cavity. No eye lesion noted. Bowels regular, appetite good, and he sleeps well. Dyspnoea marked. Put on milk diet. Passed 800 c. c. urine the first twenty-four hours; specific gravity, 1.030; highly colored; considerable albumen; some pus cells, casts abundant, both granular and hyaline; triple phosphates and amorphous urates.

Basham's mixture and milk diet were ordered. The amount of urine increased until the maximum of 4,000 was reached about October 26, but casts and albumen persisted and amount of urine gradually decreased. The ascites and anasarca increased and he grew worse until death, December 17, 1897, the immediate cause of death being œdema of lungs.

Necropsy (eighteen hours after death).—White man, brown hair, mustache, and eyes. Height, 167 cm.; weight, 50 kilos. Body œdematous. Rigor mortis (frozen). Post-mortem lividity marked. Calvarium removed, sinuses and cortical vessels injected. Dura normal. Brain weighed 1,012 grams. Ventricles full of fluid. No other pathological conditions found. Thorax: Anterior mediastinum normal. Pericardium contained about 300 c. c. straw-colored fluid. Heart weighed 260 grams, right ventricle in diastole, full of blood, left side hypertrophied and apparently contracted, valves intact, large vessels all normal. Both pleural cavities nearly full of fluid. The right lung weighed 1,900 grams and was slightly adherent to parietes by posterior aspect of upper lobe. The left lung weighed 1,700 grams. Both showed condition of passive congestion and œdema. Abdomen contained large quantity of serous fluid. Stomach contained about 200 c. c. of milk, etc. Liver weighed 2,200 grams, and upon the upper outer aspect of right lobe was a cicatrix 5 cm. in diameter, while upon the lower side was a similar one about 2 cm. in diameter. Normal tissue between them and no sign of wound or scar upon the parietes. Kidneys: Both were rather large and the capsule peeled easily. Surface was mottled and anæmic. The right kidney weighed 280 grams, the left 320 grams. Upon section the cortex was swollen, mottled pink and yellow. Malpighian bodies not more prominent than usual. No congestion of the pelvis. The suprarenal capsules appeared normal. Bladder was empty.

H. S. C.
G. W. S.

CASE 3.

C. H.; aged 29; nativity, Isle of Jersey, England.

History.—This patient was admitted to the United States Marine Hospital, Wilmington, N. C., March 24, 1897, having most of the characteristic appearances and symptoms of chronic albuminuria, these having existed with greater or less severity, judging from the patient's statements, for about a year. His face, body, and limbs were pale and œdematous, and he had well-marked ascites. He was subject to attacks of nausea and vomiting, headache, and deep somnolency. His urine was loaded with albumen, and contained casts of various kinds. He was treated with a variety of medicines, at different times, but with only temporary and partial good effects from any. Finally, after four months, the dropsical effusions that had several times much diminished, suddenly increased, and he died from compression of the lungs by the fluid in the great cavities of his body.

Necropsy (twelve hours after death).—The whole body was enormously distended by fluid. Heart weighed 266 grams. Coronary arteries and veins enlarged. Pericardial sac did not contain an excessive amount of fluid. Left ventricle, about normal capacity; wall thickened. Right ventricle nearly normal; wall somewhat thickened. Thoracic and abdominal aorta normal. The pleural cavities of both lungs were filled with serum. Both lungs were buoyant and apparently healthy, but small from compression. Abdomen filled with ascitic fluid. Peritoneum apparently normal. Stomach normal, but mucous membrane pale; the organ contained only a little fluid. Diameter of pylorus, normal; of cardiac orifice, normal. Small intestine smaller and paler than usual throughout, and nearly empty. Large intestine and rectum very much contracted in diameter, and pale. Liver apparently normal. Pancreas apparently normal. Kidneys: Left weighed 209 grams; right weighed 180 grams. These organs exhibited, to

gross inspection no very marked change from normal organs, the principle change being a lessened depth of the cortex, the pyramids being nearer the surface than usual, but the capsules were not adherent and the color, though rather pale, was fairly good. Suprarenal bodies atrophied. Spleen small. Bladder normal. Other organs not examined.

Remarks: The immediate cause of death was suppression of the respiratory function from pressure due to the sudden accumulation of serum in the pleural and peritoneal cavities. The cause of this great and rapid accumulation in a patient whose kidneys were and had been secreting about a normal quantity of fluid and whose bowels were freely moved by diarrheal discharges without medicine is an interesting problem not easily solved. The gross appearance of the kidneys did not indicate that the cause of all this vital disturbance and perverted metabolism originated in these organs, and it is difficult to believe that it did. It seems necessary to seek elsewhere for the primal cause in such cases.

J. V.

CASE 4.

Valvular disease of heart, mitral, cirrhosis of liver.

J. W. R.; aged 53 years; nativity, United States; admitted to the United States Marine Hospital, New York, N. Y., February 20, 1898; died March 24, 1898.

History.—Family history good. Alcoholic. Has had mild form of chronic rheumatism for years. For three months before admission had attacks of dyspnoea, nausea, swelling of face and abdomen. One month before admission began having pains in region of heart. On admission dyspnoea was extreme with oedema of face and legs. Examination showed area of cardiac dullness not enlarged; heart rather rapid; accentuated second aortic sound and jugular pulsation. Urine was decreased in amount (500 c. c.); specific gravity, .1010; some albumen, hyaline and granular casts. Until a week before death symptoms improved, with slight exacerbations. Dyspnoea abated and amount of urine increased to 1,000 c. c. Then all symptoms increased. Heart became rapid and feeble; breathing gasping; almost complete anuria, resulting finally in death.

Necropsy (twenty-four hours after death).—No external signs of violence; body fairly well nourished; rigor mortis marked. Calvarium removed, and about 200 c. c. thin bloody fluid ran out from membranes which were oedematous; otherwise apparently normal; weight, 1,560 grams. Thoracic cavity: Pericardium contained no fluid. Heart very much enlarged, of dark red color; aortic and pulmonary valves somewhat thickened, but competent; mitral orifice admitted three fingers; valves are incompetent and contain calcareous deposits, one of which was 1 by 3 cm., and could be broken under the fingers. Tricuspid ring enlarged; admits five fingers; valves are thinned and enlarged, but incompetent. Section shows wall of left ventricle much thickened. Heart weighs 590 grams. Lungs: No adhesions; right pleural cavity contains about 1,000 c. c. clear fluid; left about 600 c. c. Both lungs congested, and oedematous in all lobes, especially the lower. Right weighs 650 grams; left, 600 grams. Abdominal cavity: No fluid in peritoneal cavity; stomach markedly contracted, wall thick and hard; contains about 50 c. c. thick chyme. Intestines pale and contracted; appendix small, normal. Liver: Size, normal; section shows slight evidence of increased connective tissue; weight, 1,525 grams. Microscopical section shows some increase of connective tissue about the lobules; otherwise normal. Gall bladder contracted and holds about 10 c. c. of bile. Spleen apparently normal; weight, 150 grams. Kidneys: Right, dark bluish red color; capsule adherent; surface pitted and rough. On section, substance of cortex red and mottled; pyramids obscure and of fibrous appearance; blood vessels very thick. Pelvis and ureters somewhat thickened; weight, 120 grams. Left, same as right; weight, 115 grams. Microscopic;

changes of chronic diffuse nephritis of atrophic variety, viz. connective tissue stroma is very much increased in amount; is compact and organized. Tubules are atrophied, and many are obliterated from pressure; some tubules are dilated, but epithelium shows degeneration. Connective tissue capsule of glomeruli is very much thickened. Capillary tufts are atrophied, obscured, and show some waxy degeneration. Artery walls are much thickened. Bladder thickened and contracted; inner surface studded with hemorrhagic spots. Pancreas apparently normal.

S. B. G.
G. W. S.

CASE 5.

I. C. (colored seaman); aged 36; nativity, Kentucky; admitted to United States Marine Hospital, Cincinnati, Ohio, November 11, 1897, and died November 13, 1897.

History.—Patient came into hospital complaining of a severe cough and general weakness. He had been sick for a week with a severe cough before entering hospital. Gave a history of syphilis and alcoholism, and had been operated on in this hospital a year ago for fistula in ano. Physical examination: On percussion there was no dullness on either side; there were sibilant râles over left side of chest, with tubular breathing. Heart rapid and weak; no murmur. Patient had a protracted bronchial cough. Temperature, 39.5° C. Urine loaded with albumen; specific gravity, 1.008, with granular casts. Patient's condition improved slightly on the day after admission, but on the second day, while going to water-closet, dropped dead.

Necropsy (nine hours after death).—Body fairly well nourished; post-mortem rigidity absent; pupils dilated. The dura was slightly thickened and adherent. There was an excessive amount of serum in the ventricles. The brain weighed 1,320 grams. Heart: Pericardium contained an excessive amount of fluid; heart normal; left auricle contained a large clot; weight, 405 grams. Lungs: Left lung slightly adherent to chest wall at base, laterally and posteriorly. The lower lobe of lung was in a state of red hepatization; the whole lung, especially at base and middle lobe, pitted upon pressure, was very watery and heavy; weight, 1,006 grams. Right lung slightly adherent to chest wall posteriorly; otherwise normal; weight, 500 grams. The bronchioles were intensely congested throughout. Liver normal; weight, 2,160 grams. Spleen soft and pulpy; weight, 145 grams. Left kidney lardaceous; very large and pale; capsule adherent; weight, 510 grams. Right in same condition; weight, 405 grams. Intestines normal. Bladder normal and filled with urine. Rectum showed old scars of fistulæ, and was in a state of syphilitic ulceration about 3 inches above sphincter ani.

C. B. R.
J. W. S.

CASE 6.

Valvular disease of heart—mitral regurgitation.

D. L. B.; aged 45 years; nativity, New York; was admitted to the United States Marine Hospital, port of San Francisco, Cal., December 22, 1897, and died February 6, 1898.

History.—Patient became ill last November. At that time he complained of shortness of breath and of pain in his chest. Physical examination showed that the chest was narrow, long, and flat; movements were equal, but were not normal. On percussion, dullness was found at the apices of both lungs, extending down on the left side to the third rib. On the right side over the bronchus a distinct amphoric note was elicited. Upon auscultation, bronchial breathing was heard,

transmitted over the entire upper lobes of both lungs; a few moist râles were present. The heart area was enlarged downward and to the left; auscultation showed a systolic murmur to be present at the apex, with an accentuation of the second aortic sound. Liver and spleen were normal. Examination of the urine showed specific gravity was 1.020, reaction, acid; also the presence of a small amount of albumen. Reexamination of the chest, on January 25, 1898, showed the dullness over the apices to be increased. On both sides, over the bronchi, a tympanitic note was elicited on percussion and, with the mouth opened, the cracked-pot sound was heard. The patient coughed very infrequently, and the expectoration was slight. Although repeated microscopical examinations were made of the sputum, no tubercle bacilli were found. Stimulative and symptomatic treatment was employed, but the patient gradually became weaker and died of inanition at 5.45 a. m., February 6, 1898.

Necropsy (five hours after death).—The body is that of an emaciated, poorly developed adult mulatto male. Rigor mortis not well marked. Encephalon normal. Weight of brain, 1,220 grams. The pericardium is normal. Edges of the mitral valve are shrunken and thickened. The remainder of the heart is normal; weight, 350 grams. At the apex of the left lung are strong, fibrous adhesions, while at the base of the right lung the adhesions are more recent. The remaining portions of the parietal and visceral layers of both pleuræ are normal. Right lung shows areas that are infiltrated with the tubercular product; weight, 970 grams. Left lung also shows areas of infiltration, with a well-marked cavity, 2 cm. in diameter, in the upper lobe; weight, 990 grams. The peritoneal cavity is normal. The spleen is soft and spongy; weight, 250 grams. The right kidney contains two small cysts, one 1 cm., the other 2 cm. in diameter, which are situated in the cortical substance. The kidney tissue is everywhere supplanted by interstitial tissue, so that but three pyramids are seen; weight, 160 grams. The same condition obtains in the left kidney, but not to so great an extent. Five pyramids are seen; weight, 180 grams. The remainder of the genito-urinary tract is normal. The liver is normal; weight, 1,550 grams. The rest of the gastro-intestinal tract is normal. The spinal cord was not examined.

R. R. H.
W. M. J.
J. M. G.

CASE 7.

C. H. G.; aged 23 years; nativity, New York; admitted to the United States Marine Hospital, Stapleton, Staten Island, N. Y., November 4, 1897; died November 27, 1897.

History.—Gonorrhea about one year ago. Rheumatism about eight months ago, which lasted about one week. About ten days ago his ankles began to pain slightly; in a few days the pain grew worse, and he has had several sweats; no sore throat. Now both ankles and shoulder and wrist of right side are painful and swollen somewhat, but not reddened. Unable to walk during last three or four days. Appetite poor; bowels irregular. On examination his lungs were found clear. Apex heart beat displaced outward, but no murmur heard; pulse good and rhythmic; has an eruption of psoriasis over legs, arms, and face. Urine negative. He was put on salicylate soda and acetate potash, and kept in bed and given a light diet. He improved rapidly, and began to sit up on November 13. In two or three days he had a relapse, but improved again under treatment. On November 21 nausea and vomiting set in, and all medication had to be discontinued. Forty-eight hours later his stomach was in better condition, but the improvement was only temporary. Vomiting returned on the 26th, and medication was again discontinued. He was suffering no pain, but had a moderate degree of fever. His

pulse was rapid and inclined to be irregular. He was given small doses of calomel and later an enema; also a hypodermic of morphia (0.016 gram). His nausea got better and he seemed to be resting easily. At 9.30 p. m. November 26, 1897, patient went into collapse: profuse perspiration, almost imperceptible pulse, and partially unconscious. He was stimulated, and reacted fairly well, but died later, at 12.30 a. m.

Necropsy (twelve hours after death).—Body of a white man, well developed and well nourished. Rigor mortis marked, and body livid over dependent parts. Calvarium removed, and with the exception of small quantity of fluid beneath the pia, over the vertex, the cranial cavity and its contents appeared normal. Thorax: Pericardium contained a small quantity (50 c. c.) of a muddy fluid, and the serous surfaces of the pericardial sac showed several white roughened spots. The heart was enlarged generally (weighing 420 grams); the chambers of both sides were filled with tough, yellowish clots, especially in the ventricles, which were entirely filled, the valves being tightly closed by the clots. The endocardium of the left heart, around the mitral valve, showed a ring of small granular growths and appeared thickened; all valves closed well. Lungs: Except for one or two slight pleural adhesions, the lungs were normal. Abdomen: Cavity contained small quantity of fluid. Both kidneys were alike in all respects, except the left was a little larger (right weighed 410 grams; left, 437 grams); they were very large and pale, their capsule stripping off easily, leaving a smooth, pale surface behind. On incision the whole organ was found to be made up mainly of the cortex, which was of a pale-yellowish color and rather friable. The purplish-red color of the pyramids showed in sharp contrast against the pallid cortex. The suprarenals and ureters normal. Bladder: Walls hypertrophied and its capacity greatly decreased, but its mucous membrane clean. Spleen, liver, stomach, and intestines normal.

C. H. L.

G. W. S.

CASE 8.

Syphilis, Secondary.

G. S.; aged 52 years; born in Tennessee; admitted to the United States Marine Hospital, St. Louis, Mo., May 2, 1898; died May 5, 1898.

History.—The patient was brought to the hospital in the ambulance. He stated he had been sick with his present trouble a number of times. This attack began three weeks ago with shortness of breath and great weakness. Ten days before he was brought here his feet began to swell, and his nose bled very often. He had an ulcer on his penis twenty-five years ago, after which in a little while he had sore throat and a papular eruption on his head. Physical examination: Body fairly well nourished; an indolent ulcer on the back of each wrist, and a small ulcer on side of neck; blood dripping from nose; chest well developed; no dullness on percussion over lungs; vocal fremitus not increased; respirations 19, respiratory murmur soft and breezy; pulse, 68; a soft, blowing murmur heard at apex of heart; liver not enlarged; urine loaded with albumen; ankles swollen, and feet œdematous. During the few days the patient lived he vomited everything that was given him. His mind was clear at intervals, but most of the time he was in a state of coma from which he could be aroused with difficulty. The last two days he passed very little urine, and his respiratory movements were irregular and much labored.

Necropsy twelve hours after death.—Body well developed and well nourished. Height, 168 cm. Large ulcer on back of each wrist; another one on side of neck, and scars of other sores on face and neck. Rigor mortis well marked. Abdominal organs in normal position. Intestines dark bluish color and slightly distended

with gas. Abdominal wall, $1\frac{1}{2}$ cm. thick, contains some yellow fat. Pericardium covered with fat. A quantity of soft, white, fibrous tissue on inner surface of pericardium: this tissue is not continuous over the entire surface, but only occurs in places: 75 c. c. of a dirty brown fluid in pericardium. Dimensions of heart: Length, 15 cm., width, 9 cm., thickness, 6 cm., weight, 375 grams. Right ventricle empty, wall 1 cm. thick, valves normal. Left ventricular wall 2 cm. thick, contains one small, dark blood clot; outer leaflet of mitral valve very small, right leaflet thickened and lower edge roughened, papule size of bird shot on inner surface. Base of one leaflet of aortic valve calcified and spicula of bone extends out to apex. Left lung 25 by 15 by 9 cm.; weight, 700 grams; lower lobe dark bluish color, crepitant; on section dark blue fluid escapes; upper lobe grayish, mottled with blue; crepitant, except at apex, where a large caseous nodule, 6 by 7 cm., exists. Right lung 28 by 20 by 10 cm.; weight, 750 grams. Condition of right lung similar to left, except that only a few hard nodules found in apex. Stomach, 25 cm. long; greatest diameter, 12 cm.; contains 125 c. c. dark fluid; inner surface dark purple, near pyloric orifice nearly black. Spleen, 12 by 9 by 3 cm.; weight, 120 grams. Internal structure, dark brown. Left kidney, 10 by $5\frac{1}{2}$ by $3\frac{1}{2}$ cm.; weight, 120 grams; surrounded by a quantity of fat. Upon section pelvis contains fat, and cortical portion is only 2 mm. in thickness, pyramids small, tissue between pyramids of a grayish yellow color. Kidney tissue very resistant to knife. Right kidney, 8 by 5 by $3\frac{1}{2}$ cm.; weight, 120 grams. Condition of right kidney similar to the left. Bladder contains a small quantity of urine. Liver, $28\frac{1}{2}$ by 19 by $9\frac{1}{2}$ cm.; weight, 1,800 grams; color, dark brown; internal structure very soft.

W. G. S.

CASE 9.

Chronic Interstitial Nephritis.

J. B. (colored); aged 29 years; nativity, Louisiana; admitted to United States Marine Hospital, New Orleans, La., March 17, 1898, died March 30, 1898.

History.—Taken sick four weeks ago with shortness of breath, nausea, and vomiting. Has since lost strength; dyspnoea has persisted, as has also irritability of stomach. At present, appetite poor, some nausea, bowels usually constipated; makes considerable urine; no cough nor pain in chest; has never spit up blood. Examination: Some oedema of eyelids, syphilitic history and scars over both legs; scars from cuts on body, neck, and arm, one in right side (from empyæma operation). In each instance the scar tissue was produced in great excess. Lungs contain scattered mucous râles; right lung below scar of chest shows evidence of former inflammation with production of thick adhesions. Heart normal, except for soft inconstant murmur at apex, not heard behind nor transmitted into axilla, aortic and pulmonary sounds normal.

Liver dullness small; urine of 24 hours, 2,500 c. c. in amount; considerable albumen; otherwise examination was negative. Patient was confined to diet of milk, with lime water. He remained in this condition for some days. Nausea and vomiting became excessive. Urine examination of March 25, 1898, showed it to be clear; reaction, alkaline; specific gravity, 1019; albumen, considerable. Microscopic examination: Round epithelial cells, single; few bunched epithelial cells; oxalates scattered; ammonium-magnesium phosphates; pus cells and red blood cells; urates and amorphous urates and phosphates. Was given steam baths daily since March 26, and nitroglycerin. Nausea and vomiting gradually subsided. Pulse was weak and patient appeared apathetic on the 28th; he became brighter on the 29th, but on the 30th went into partial stupor; pulse weak and signs of beginning oedema of lungs. Stimulants of nitroglycerin, strychnine, followed by withdrawal of 200 c. c. of blood and a venous injection of 500 c. c. of

normal saline solution injected into cephalic vein. Was wrapped in hot blankets. He revived for several hours, but lingered in stupor until death occurred at 1.45 p. m., March 30, 1898.

Necropsy thirteen hours after death.—Body well nourished; muscular man; covered with scars over his legs and thighs and a long scar on neck, also scars on chest, right arm, and forearm; scar tissue overproductive. Rigor mortis beginning in jaw and face. Heart weighs 467 grams; left ventricle is much thickened, hypertrophied and enlarged; nothing abnormal noticed on valves. The right ventricle was flabby and contained a few clots of blood; valves normal; heart walls on right side normal. Lungs were bound down by very dense adhesions over whole surface, particularly on right side. Right lung weighed 299 grams. On section the bronchi were filled with a frothy fluid. Bronchi filled with frothy fluid. Left lung weighed 270 grams. Nothing abnormal was noticed in abdomen; peritoneum was smooth and glistening; stomach normal, small intestine flat, large bowel slightly distended. Liver weighed 1,970 grams. Its capsule was thickened and adherent. There were several white scars noticeable on surface, probably syphilitic. Kidneys: Left weighed 180 grams; right weighed 107 grams. The kidneys appeared contracted, small, pale in color, its capsule quite adherent. Pelvis of kidneys small, ureters apparently normal. Bladder contained about 200 c. c. of urine, its walls were normal; prostrate and urethra normal; suprarenal capsules appeared normal. Spleen weighed 335 grams; capsule was adherent. Head and scalp normal; skull normal: membranes and brain normal. Weight of brain 1,337 grams. Its ventricles were large and contained a clear fluid. Primary cause of death was chronic interstitial nephritis. Secondary cause: Exhaustion and oedema of lungs.

R. VON E.
S. N.

LACERATION OF KIDNEY-VALVULAR DISEASE OF HEART, WITH SECONDARY DIPHTHERITIC DYSENTERY.

N. M. (colored); aged 49 years; nativity, Kentucky; admitted to United States Marine Hospital, Louisville, Ky., on the night of March 1, 1898.

History.—He was exceedingly ill when admitted, and only an incomplete history could be obtained; he stated that he had been suffering from diarrhea or dysentery for four weeks, the number of stools in twenty-four hours is from twelve to fourteen; at times stools are only streaked with blood, at others large quantities of blood are passed. Physical condition is bad; the features are pinched, the tongue dry and cracked, teeth covered with sordes; there is considerable tympanitis, with tenderness all along line of colon; the pulse is 100 per minute, the temperature 37° C. The femoral arteries pulsate so strongly as to suggest a lesion of aortic valves (this was found to be the case); a loud diastolic murmur being observed upon auscultation; the lungs appeared to be clear. Owing to the low condition of patient and the admixture of feces and urine a specimen of the latter could not be obtained, though he stated that he had not passed any blood from kidneys. He also claimed that he had always enjoyed good health up to time of present attack. This statement was not borne out by post-mortem findings. Death occurred at 5.30 on the morning of the 3d instant.

Necropsy (six hours after death).—Body is that of slightly built but muscular colored male; the adipose tissue is slight in quantity; the eyes are closed; there is no discharge from nose or mouth; the hair on head is scant and thin; the hands are slender, the nails long; the teeth are broken and carious, the front teeth missing; the neck is very easily movable; the chest is full; abdomen distended; no rigor mortis; no post-mortem discolorations; no cicatrices on body; the glans penis is unusually large, and the prepuce long. The soft parts covering the skull

are divided by an incision carried transversely over the head and reflected back; there is no evidence of external injury to head; the skullcap is sawn through and removed; the bone is found to be uniformly thin, which is rarely the case in the negro race; the brain does not seem to fill its bony envelope completely; the dura mater is tough and somewhat difficult to detach; the surface of the brain is well formed; the pia mater seems congested; the veins are filled with blood, tumid to roundness; there is about 50 c. c. of serous fluid in the cranial cavity; the surface of the brain has a peculiar bluish-gray color, such as I have observed in the brains of those dead from pernicious forms of malarial fevers (and heretofore in no other cases); there is a small, almost inappreciable quantity of clear fluid in the lateral ventricles, and the cavities of the ventricles seem slightly larger than normal; the brain tissue is hard to cut (comparatively), is moist and glistening; pits on pressure; a considerable degree of pressure can be exerted without lacerating brain; a section of brain held under a strong stream of water does not wash or break away at all; these conditions I have observed in sclerosis of the brain; the lobes at base of brain cut through by numerous parallel transverse incisions; no alteration apparent. Weight of brain: Cerebrum, 1,310 grams; cerebellum, 200 grams. The pericardium contained about 350 c. c. of fluid. The pleura is strongly adherent to both lung and chest wall on the right side; no adhesions on left side. The heart is about the size of a man's fist; its cavities, particularly those of the right side, are filled with dark, clotted blood; about 150 c. c. in heart and large veins; the ventricles are both hypertrophied, the left one more so; the aortic valves are thickened and incompetent; the mitral valves contained a few vegetations; the other valves are pale and flabby; the aorta is thickened and sclerosed; weight of heart after opening, 390 grams. Left lung appeared normal; weight, 320 grams. Right lung oedematous in lower lobes; weight, 430 grams. Spleen small; bluish in color; at one point a hemorrhagic infarct has occurred, but has been mostly absorbed; weight of organ, 90 grams. Left kidney has a cyst on convex surface as large as a walnut; this cyst extended through into pelvis of organ; there were four small cysts in this kidney; kidney lobulated, hard, and pale; capsule peeled readily; weight, 225 grams. Right kidney has the shape of a heart; is displaced upward and bound to under surface of liver by strong adhesions; to its undersurface the transverse colon was so strongly attached as to tear in removing. The ureter is dilated to the size of a finger near the kidney, but occluded farther down. The kidney substance had undergone atrophy to such an extent that only a small portion remained at the upper and lower ends; the organ was dilated into an immense hematoma (hæmatonephrosis); size, 40 cm. long, 33 around; the blood was clotted hard, and the fibrin was becoming organized; there had evidently been a laceration of substance of organ within and retention of blood. The weight of this hematoma or blood cyst is 910 grams before opening; the sac weighed 390 grams. Liver weighs 1,770 grams; substance hard and contracted; cirrhosis. Gall bladder distended with thick, black bile. The colon is almost gangrenous throughout its whole extent; the mucous membrane ulcerated and hanging in shreds; many of the ulcers were large and had perforated in several places. The omentum is inflamed and discolored. Urinary bladder empty.

W. P. McI.

SURGICAL KIDNEYS.

W. S.; aged, 63 years; nativity, New York; admitted to the United States Marine Hospital, Cairo, Ill., December 24, 1894; died June 18, 1898.

History.—When admitted he was suffering from rheumatism and organic stricture of the urethra. His urine was drawn twice daily, as he was unable to pass it. In 1895 he was treated for chronic cystitis, and he has since that time continued to suffer from this condition. He has complained at times of loss of mus-

cular power on the right side, and a sensation of burning. He has had several attacks of profuse diarrhea of uræmic origin. One of these occurred in September, 1897, and was accompanied by coma and muscular twitching. The urine contained albumen. During the last three months he has had incontinence of urine. On June 10, the last attack of diarrhea began, and persisted up to the time of his death. The patient slept a greater part of the time, and there was incontinence of both urine and feces.

Necropsy (twelve hours after death).—Marked emaciation of muscles; rigor mortis present. Brain: Dura mater opaque; arachnoid distended with fluid. The arteries at the base of the brain showed many white patches of degeneration in their walls. Lungs were firmly adherent to the chest wall at their apices; the lung tissue was pale in color and crepitant throughout. The heart was small; valves normal; muscular tissue firm. The large vessels were of normal appearance. The spleen was of small size and firmly adhered to the diaphragm. There was considerable increase of connective tissue, as shown to the unaided eye. There was corresponding lessening of pulp and blood. The adrenals were thin and dense, and of dark-gray color on section. The stomach and intestines were of pale appearance internally, but the latter showed some injection of vessels externally. The liver was clay color, containing little blood. The gall bladder was distended with bile; common duct permeable. The left kidney was surrounded by a mass of fat, which, with the capsule, was very firmly adherent to the kidney. The pelvis was widely dilated, the medullary substance having almost disappeared. The cortex was much thinner than normal, and its color denoted fatty change. There were several small urinary cysts. The right kidney was rather smaller than the left, its outer surface presenting numerous eminences and depressions. Several of the prominent points were of dark-red color and somewhat softened; the cut surface showing triangular discolorations base outwards, probably due to hemorrhage. The ureters were sufficiently dilated to receive the point of the little finger. The bladder was contracted; walls thickened; mucous surface covered with bright red patches. The urethra presented a stricture of medium caliber at the meatus.

P. C. K.

NECROSIS OF SACRUM—LARGE WHITE KIDNEY.

W. A. (colored); aged, 26; nativity, Tennessee; admitted to United States Marine Hospital, Evansville, Ind., October 29, 1897; died April 7, 1898, at 8 a. m.

History.—Patient was in the hospital once before, and was treated for the same trouble. He was admitted January 6, 1896, and discharged improved September 23, 1897. The trouble for which treatment was first sought began in 1894 as a swelling over the sacrum. This swelling was incised, and a large amount of pus escaped. He had been operated on about a year previous to admission to the hospital. An incision was made at that time, and the sacrum curetted on its posterior surface. After the opening of the abscess a sinus remained, which discharged freely. Several operations were performed. They consisted in removing diseased bone and curetting. Test for albumen in urine showed the presence of kidney disease also. Various plans of medication were tried. He failed rapidly during his last stay in the hospital, and died at 8 a. m. April 7, 1898.

Necropsy (twenty-six hours after death).—Rigor mortis marked. General nutrition of patient poor. The calvarium was removed and the condition of the skull-cap, the brain case, sinuses, vessels, brain and its membranes found to be normal. Weight of brain, 1,400 grams. All the organs in the thorax were found to be normal. Weight of heart, 250 grams. Right lung, 820 grams, and left lung, 530 grams. All the organs in the abdomen were normal with the exception of the kidneys. They were enlarged and were of the large white variety. The cortical substance was thickened and hard to define. Weight of liver, 1,830 grams; spleen,

180 grams: pancreas, 50 grams; right kidney, 390 grams: left kidney, 400 grams. There was a large opening to the left of the median line, at the bottom of which could be seen the exposed sacrum. An area of about 4 by 8 cm. was exposed. On examination this proved to be the posterior surface of the third, fourth, and fifth sacral vertebrae to the left of the median line. The auricular surface was not involved. The laminae had not given way and the sacral canal was not exposed, but the third and fourth sacral foramina were about in the center of the diseased portion of bone and they were empty, the structures they normally transmitted having disappeared. The anterior surface of the sacrum was not involved.

J. H. O.

SENILE DEGENERATION, CARTELAGE OF HIP JOINT.

T. W.; aged 68 years; nativity, Ireland; was admitted to the United States Marine Hospital, port of San Francisco, Cal., on June 6, 1883, and died May 7, 1898.

History.—On admission the patient complained of a severe pain running from his hip to his knee. Later the pain was not confined to the thigh, but was felt in the shoulders and arms. Buck's extension was applied to hip continuously for four months, but the pain persisted for some time, finally becoming less intense and assuming the character of rheumatism. September 25, 1894, he fell down a flight of stairs sustaining a severe contusion of the entire left side of trunk; also the left elbow, knee, and foot. Patient never entirely recovered from this fall. He complained constantly of a pain in the left side about the ninth rib. On April 1, 1897, he complained of severe itching of the skin covering the thighs. This was relieved by several baths in a 1-400 solution of bichloride of mercury. After this, patient remained the same until May 3, 1898, when he was seized with double croupous pneumonia, dying at 3.15 a. m., May 7, 1898, from exhaustion and the debility of age.

Necropsy (eight hours after death).—The body is that of a poorly developed and emaciated adult, white, male. Upon the ninth rib on the left side, at its junction with the cartilage, is a cartilaginous tumor about 2 cm. in diameter. Rigor mortis is well marked. Skullcap, brain case, and sinuses are normal. Over the entire convex portion of the cerebrum are evidences of a chronic pachy meningitis. The cerebro-spinal fluid is increased in amount. Brain is normal; weight, 1,245 grams. The pericardial sac contains about 50 c. c. of serous fluid. The aortic valves are atheromatous and steuotic, otherwise the heart is normal; weight, 380 grams. The aorta shows evidences of arterio-sclerosis. The right pleura contains about 250 c. c. of serous fluid, otherwise the parietal and visceral layers of the right pleura are normal. Both layers of the left pleura are bound down by strong, fibrous bands. Upon section the right lung, upper lobe, is consolidated, while the lower lobe is hypostatically congested; weight, 1,040 grams. The lower lobe of the left lung is in a condition of atelectasis; the upper lobe is congested; weight of left lung, 580 grams. The peritoneal cavity is normal. Spleen is soft, spongy, and very much congested; weight, 95 grams. The left kidney, upon section, shows evidences of interstitial nephritis; weight, 135 grams. The right kidney is undergoing fatty degeneration; weight, 115 grams. The walls of the bladder are very much thickened. The remainder of the genito-urinary organs are normal. The liver is soft and friable; weight, 1,245 grams. Pancreas normal; weight, 65 grams. The rest of the gastro-intestinal tract is normal. The greater portion of the cartilage which covers the head of the femur and lines the acetabulum is absent, and the corresponding surfaces are roughened and in places eburnated. The spinal cord was not examined.

R. R. H.
T. B. P.
J. M. G.

FRACTURE BASE OF SKULL.

N. J.; aged 35 years; nativity, England; was admitted to the marine ward, St. Vincent Hospital, Portland, Oreg., January 15, 1898; died January 19, 1898.

History.—One hour before admission the patient was injured by falling through an open hatchway of a vessel a distance of 23 feet and striking on his head. He was picked up by his comrades and immediately sent to the hospital, being profoundly unconscious. An examination showed the existence of hemorrhage from the left ear and the nose, but no evidence of depressed fracture could be detected, although a marked contusion existed in the occipital region. He was still unconscious, but his pupils were normal in size and reacted to light. Respiration was 16 per minute and somewhat loud, but was at no time stertorous; pulse was slow, 56 per minute; temperature normal. There was no paralysis, and further examination detected a broken clavicle. A diagnosis of linear fracture involving the base of the skull was made. Ice was applied to the head; the ears were gently washed out with bichloride solution and plugged with absorbent cotton, and the patient placed at rest. There was no difficulty in swallowing, and milk was ordered given at regular intervals.

January 16.—The condition of the patient remaining the same, although the symptoms were those of contusion of the brain rather than compression, it was deemed advisable to make an exploratory incision and trephine if necessary. A curved incision 3 inches in length was made in the left parietal region, a perpendicular line through the external auditory meatus intersecting the middle of this incision. A linear fracture was revealed with a horizontal limb involving the squamous portion of the temporal and parietal bones, and from each end of this, secondary fissures extended to the base. There was no depression of the bone, and no gaping of the fissures except in the descending posterior portion of the fracture. But believing it to be good surgery to trephine in all such cases, and thinking that there might possibly be a depression of the internal table alone, a large button of bone was removed, and the opening much enlarged by the rongeur. The dura was incised to ascertain if any clot existed beneath, but nothing of this character was found, or anything that would produce compression. The brain substance at the site of the fracture was healthy and no hemorrhage or laceration of its tissue was visible. The patient was not materially affected by the operation. The temperature two hours later was normal and pulse 65, full and strong. He was still profoundly unconscious.

January 17.—Condition the same, pulse 70, temperature normal.

January 18.—Temperature 40° in the morning; pulse 120, weak and thready; still unconscious and general condition much worse. Everything pointing to dissolution.

January 19.—Pulse, 140; temperature, 40.5°. Death occurring at 2 p. m. Patient at no time regained consciousness after the injury.

Necropsy (twenty hours after death).—External appearances: Body well nourished; post-mortem rigidity marked; post-mortem lividity slight. Cranium: A fracture existed, commencing 1 inch in front and 2½ inches above the external auditory meatus on the left side, and involving the squamous portion of the temporal and the parietal bones. This was 2 inches in length from before backward, and extending downward, inward, and forward from its posterior end was a fissure that passed through the posterior inferior angle of the parietal bone, crossing the lateral sinus in this situation, and continuing through the lower part of the occipital bone, terminated in the foramen magnum. Extending downward and inward from the anterior extremity of the horizontal portion of the fracture was another fissure, forming the anterior limb. This involved the squamous portion of the temporal bone, passed through the great wing of the sphenoid, being 1 inch anterior to the superior border of the petrous portion of the temporal

at outer side of skull, but converging toward the apex of the petrous portion as it passed inward through the base of the skull, crossing it in that situation and producing a transverse fracture. From this point it extended backward, passing through the body of the sphenoid, and terminated at the apex of the petrous portion of the temporal bone of the opposite side. There was also an anterior divergence of this fissure, which passed forward from the petrous portion through the body of the sphenoid in front of the sella turcica, continuing through the body of the ethmoid and terminating at the cribriform plate. A small clot of blood was found between the dura mater and the skull at its base in the occipital region, evidently due to hemorrhage from laceration of the lateral sinus, and another extravasation of blood existed between the dura and the skull in the temporal region. There was some congestion of the meninges at the base of the brain and over the posterior portions of the hemispheres. There was only a slight contusion of the brain at the site of the injury; but directly opposite, involving the first and second convolutions of the temporo-sphenoidal lobe, the brain tissue was extensively lacerated and contused. Around the lower end of the fissure of Rolando there was slight congestion, but no contusion of tissue, the location of the injury of the brain explaining the absence of symptoms of paralysis during life. Thoracic cavity: The pleuræ were normal; pericardium was healthy, and contained 50 c. c. of pale straw-colored fluid; the heart and the lungs were macroscopically normal. Abdominal cavity: None of the abdominal viscera showed pathological changes. The different organs were not weighed on account of the poor facilities available for such work.

J. C. P.

CARCINOMA OF THE STOMACH.

H. N. (colored); aged 45; nativity, Virginia; admitted to United States Marine Hospital, Stapleton, N. Y., December 15, 1897; died January 6, 1898.

History.—Height, 165 cm.; weight, 71 kilos. Fairly well nourished and developed. About six weeks before admission he noticed pain in his abdomen, which was accompanied by vomiting and griping. Bowels were rather constipated and appetite was poor. On admission he complained of pain in the upper part of abdomen, constipation, and anorexia. Arteries hard and tortuous at the wrist. Aortic second sound accentuated. Both lobes of liver easily palpated below ribs and tender. Upper limit of dullness about seventh rib. Examination otherwise negative. Urine 1.025, alkaline, cloudy sediment; phosphates and urates. Iodide of potassium given.

December 16.—Cancer of cardia diagnosed. Pain and tenderness were always present over whole upper part of his abdomen. His bowels continued costive and were relieved by enemata. Morph. sulph. was given several times as an analgesic. He steadily lost flesh and had increased difficulty in swallowing or retaining his food. On thirtieth December nutrient enemata were ordered, and seemed to aid him, and a soft rubber stomach tube with difficulty was inserted into his stomach, but attempts to secure gastric fluid were ineffectual; some peptonized milk and brandy were, however, introduced. Operation was, after consultation, thought to be useless and inexpedient. He steadily lost flesh and strength until death, 4 a. m. January 6, 1898.

Necropsy (eight hours after death).—Man about 45 years of age, 165 cm. height and 45 kilos weight. Body emaciated. Rigor mortis slight. Calvarium removed and bones found rather thin and compact. Dura thickened. Brain weighed 1,450 grams. The frontal lobes were poorly developed and the ventricles had small quantities of fluid. No pathological lesions in skull. Thorax: Nothing abnormal in anterior mediastinum. The pericardium normal and contained about 100 c. c. of amber-colored fluid. The heart weighed 250 grams; valves and walls were

intact. The left lung weighed 500 grams and was free from adhesion to the pleura. The right lung weighed 760 grams, and the lower lobe was closely adherent to diaphragm and adjacent pleura. Both lungs were in a state of passive congestion. The bronchial glands were all enlarged, several being 2 cm. in diameter. The abdomen was flat upon making the median incision. The transverse colon and the lower border of the liver were found adherent to the anterior belly wall and to each other about 5 cm. above the umbilicus. To the colon the greater curvature of the stomach was directly adherent. The lesser curvature was adherent to the left kidney and posterior wall. The whole formed a cavity, which was connected with the stomach cavity by an aperture on the anterior face of the stomach, here turned upward upon its longitudinal axis, so that its anterior face looked upward and backward. The cavity had a capacity of about 400 c. c. The stomach was 25 cm. long and 9 cm. broad. Its walls were thickened throughout, being 2 cm. at the cardia, 1 cm. about the fundus, and 3 cm. at the pylorus. Upon the anterior wall was the foramen above mentioned, its edges smooth and cicatricial, its longer diameter 7 cm., the shorter about 2 cm. It seemed of long duration, and there were no signs of recent ulceration. The contents of the stomach and the other cavity were milk and other foods. The cardiac opening was about 1 cm. in diameter, the pyloric 1.5 cm. Liver, 1,800 gm. weight, light in color, and firmer than normal in texture. The left lobe comparatively large and lighter in color than the right. The peritoneum forming part of the cavity wall was thickened, and the tissue for 1 cm. beneath it black in color. Gall bladder contained about 20 c. c. of viscid fluid. Spleen was very small (60 grams) and triangular, with well-marked notches. Kidney: Left, 200 grams in weight, firm, and pale, and, as mentioned, was adherent to the stomach near cardia; right, 190 grams in weight and normal. The bladder contained 300 c. c. of dark urine. The intestines were empty and nothing abnormal was found. The pancreas was involved by its head in the dense adhesions and was destroyed in removal. Other organs and tissues normal.

H. S. C.
G. W. S.

SCIRRHUS OF STOMACH.

H. J. W.: aged 47 years; nativity, Ireland; admitted to the United States Marine Hospital, New York, April 6, 1897; died May 11, 1897.

History.—The patient is of average height; has brown eyes, reddish mustache, and light hair. Has never had any serious illness, except chills and fever. Has been a hard drinker. Complains of pain about the heart and legs, which has existed for some time. As he is intoxicated, no satisfactory history can be obtained.

April 7.—Has no appetite and nothing will stay on his stomach, as he has a constant nausea. Has a bitter, nasty taste in his mouth. Has a great deal of pain in his "heart" and between the shoulders. Legs are weak, and he has some difficulty in walking. Has dullness of vision and inability to see well at times. "Is light in his head," but has no headache. Has rumbling in ears. Is very nervous. Physical examination: Slenderly built. Head projecting forward. Left oblique hernia forming quite a tumor, which can be easily reduced. Wears a truss. On palpation, liver and spleen seem normal. Some tenderness on deep pressure over the liver. Percussion showed normal lung resonance. Apex beat of heart to the left of mammary line. Auscultation gave a wheezing sound over bronchi. Heart sounds seemed normal. Short of breath, especially on walking upstairs. Skin in fair condition. Bowels regular. Urine reddish. Denies venereal trouble.

April 8.—The same as yesterday.

April 9.—Rather weak. Getting over his spree slowly. Seems to be sick besides.

April 10.—Found this morning wandering around the yard very lightly clad. Could not explain his actions. Put on milk diet. Quite delirious, tongue coated. He annoys the other patients by attempting to take their clothes and search lockers. Was up all last night and it is impossible to keep him in bed without restraint.

April 12.—Not improving; has delirium, and sees all kinds of imaginary horrors. Has not slept any for forty-eight hours. Given anodynes, which caused him to sleep during the night.

April 16.—Improving slowly. Is over delirium.

April 19.—Calomel, 0.12; ft. chart. No. 1; sig., give at once.

April 20.—His tongue and lips badly swollen. Has a bad odor to his breath. Is ptyalized.

April 25.—Getting weaker. Mouth better. Liver enlarged. Complained that he could not swallow. Laryngeal examination negative. Tube passed into stomach and milk punch poured in. Ophthalmoscopic examination negative.

May 1.—No better; getting weaker; can not keep milk on stomach.

May 5.—Feed with stomach tube.

May 8.—Give rectal enemas. Died of exhaustion.

Necropsy (eighteen hours after death).—The calvarium removed. The dura was adherent to skull and brain in several places. Sinuses normal. Arachnoid contained some fluid. Brain normal. The heart, pericardium, and lungs were normal. On the right side there was a firm pleuritic adhesion. The great blood vessels, the nerve trunks, and diaphragm were normal. The omentum was very thin. Spleen, soft; kidneys, supra-renal capsules, urinary bladder, organs of generation, rectum, duodenum, mesentery, small intestines, and abdominal blood vessels were normal. The appendix was very short. On the left side there was a hernial sac, which was empty. The walls of the sac were quite thick. The colon was adherent to the parietal peritoneum near the margin of the internal ring. The cause of the trouble was found to be a scirrhus tumor about the size of a large orange, involving the greater convexity of the stomach at the cardiac end, the head of the pancreas, and the lobus spigelii. The duodenum, strange to say, was not involved. The pylorus was in no way involved. The walls of the stomach, which were involved, were ulcerated through and for some distance into the tumor. This had produced a small cavity, which was filled with necrotic tissue.

J. O. C.

G. W. S.

CARCINOMA OF PYLORUS AND PANCREAS.

A. C.; aged 38 years; nativity, New York; was admitted to the United States Marine Hospital, port of San Francisco, Cal., on November 29, 1897, and died May 28, 1898.

History.—The patient, when admitted, complained of constant pain in the abdomen, of vomiting, loss of appetite, and of weakness. Said that he had lost 20 pounds in weight during the past three months. Physical examination showed that the heart, lungs, liver, and spleen were normal. Upon palpation pain was felt in the epigastric region. In the region of the pylorus, at the site of the most pain, a hard intumescence was felt. The vomited matter consisted of undigested portions of food, slime, and mucus, but at no time was it the characteristic coffee-ground vomit. Treatment was symptomatic and palliative. Owing to his inability to digest any solid and a very small amount of liquid food, he became very much emaciated and markedly asthenic. He died at 9 a. m. May 28 of inanition.

Necropsy (twenty-nine hours after death).—The body is that of an extremely emaciated adult white male. Rigor mortis well marked. Eucephalon normal. Weight of brain, 1,160 grams. The pericardium is normal. Heart normal;

weight, 180 grams. A few adhesions are present at the apex of the right lung; otherwise the visceral and parietal layers of both pleuræ are normal. Lungs, upon section, are seen to be normal, with the exception of the lower lobe of the right lung, which is hypostatically congested. Weight of right lung, 400 grams; left, 400 grams. The bronchial glands are enlarged. The peritoneal cavity is normal. On the convex surface of the spleen is a triangular area, pinkish in color, and upon palpation of denser consistency than the remaining tissue of the organ. Weight, 140 grams. The pyramids of the right kidney are normal. Weight, 80 grams. The left kidney is absent. The remaining organs of the genito-urinary tract are normal. Liver tissue is very flabby. Weight, 870 grams. The tail of the pancreas is enlarged and quite hard. Extending around the pyloric end of the stomach and along the greater curvature is a tumor mass, hard and scirrhus in character, $12\frac{1}{2}$ cm. long and 5 cm. broad. The stomach is distended, with a foul-smelling, semiliquid substance. The transverse colon is filled with hardened feces. In the right iliac fossa the cæcum is bound by fibrous bands to the ventral surface of the ilium. The appendix vermiform shows evidences of a previous inflammation. All the organs show evidences of the marked anæmia that was present. The spinal cord was not examined.

R. R. H.

T. B. P.

J. M. G.

SCIRRHOUS CARCINOMA OF THE PANCREAS.

T. H.; aged 53 years; nativity, Maryland; admitted to United States Marine Hospital, Baltimore, Md., August 27, 1897; died, October 23, 1897.

History.—The patient said that he had always been healthy until the commencement of his present trouble, about ten months ago. Said it began with paroxysmal pain in his abdomen, jaundice, and occasional attacks of chills and fever. On admission to hospital patient was somewhat emaciated, tongue coated, and bowels obstinately constipated. The skin and conjunctivæ were of a lemon-yellow color. Appetite poor, and nausea and vomiting very troublesome. Temperature and pulse normal. Examination of the liver and spleen showed the former to be smaller than normal, while the latter was enlarged. Urine dark colored, but contained neither sugar nor albumen. During the progress of the disease, patient complained of severe paroxysmal pain in the epigastrium. Nausea, vomiting, and obstinate constipation were also prominent subjective symptoms. Emaciation was progressive, and loss of strength and dyspepsia were present. An ill-defined tumor mass was discovered in the epigastric region. The jaundice became more marked, and before death the skin had assumed a bronze color. About ten days prior to death the bowels became lax for the first time and moved involuntarily, the feces being of a dark-greenish color. The treatment was symptomatic, purgatives and laxatives being freely administered. About one month before death there were occasional, irregular exacerbations of temperature and pulse in the evening, but at no time did the temperature go over 39° C., or the pulse exceed 100, morning register being always normal. Patient grew gradually weaker, jaundice more marked, emaciation extreme, and death occurred at 4 a. m. October 23, 1897.

Necropsy (eighteen hours after death).—Rigor mortis not marked; body extremely emaciated; skin of a brown color. Pericardium contained a small amount of clear fluid. Heart weighed 250 grams; valves normal. The pleuræ were normal, save at the right apex, where some slight adhesions existed. Lungs: There was considerable congestion in the lower lobes of both lungs. The right weighed 290 grams; the left 280 grams. Liver weighed 1,440 grams. Very firm

to the touch, hard and resistant to the knife. Several carcinomatous nodules were found in the right lobe. Sections were dark in color and stained with bile. The gall bladder was distended with a viscid fluid, about 250 c. c., light colored, and containing little or no bile. The ducts were apparently pervious. A scirrhous carcinoma was found invading the head of the pancreas, encroaching upon the liver and common bile duct. The mesenteric glands about the site of the new growth were much enlarged, and some had ulcerated, forming an abscess just below the pancreas. Stomach apparently normal. Spleen weighed 280 grams. Capsule somewhat thickened. Sections presented a purple color. Right kidney weighed 140 grams; left kidney 190 grams. Capsules were not adherent. Both kidneys were dark in color and rather resistant to cutting. Cortical substance somewhat atrophied. Intestines apparently normal. Urinary bladder contained a small amount of urine and was normal. Generative organs normal. Brain normal.

J. McM.

G. P.

CARCINOMA OF LIVER.

K. M. P.; aged 44; nativity, Norway; admitted to United States Marine Hospital, Mobile, Ala., March 30, 1898; died, April 16.

History.—Patient only knew a few words of English, making it very difficult to obtain satisfactory history; no one in hospital to translate. Had cleft palate, making it difficult to articulate. Family and previous history negative from patient's inability to speak English. Says had had severe colic in epigastric region, radiating to right side, once or twice since he began to turn yellow. Had suffered with slight pain in epigastric region for about one month; bowels slightly constipated, actions slate colored; good appetite, but did not digest food properly; slight degree of jaundice for three or four weeks; has lost some weight, but not much; one-half of tongue clean, other covered with dirty, yellowish-white fur. Physical examination: Sclerotics tinged yellowish; general body surface a light yellow. Lungs negative. Heart normal, except for a quite marked accentuation of second sound at pulmonary interspace; splenic dullness apparently normal; not palpable. Liver dullness not increased upward at all and very slightly downward, to about from one-fourth to one-half inch below ribs; on palpation an elastic, pyriform swelling, with large end below, is distinctly mapped out and decided to be an enlarged gall bladder; other organs apparently normal; temperature, 37.2°; pulse, 78; respiration, 20. In view of the slight enlargement of liver, much enlarged gall bladder, slight fever, which only lasted one day, history (though true very vague) of gall colic, and absence of cachexia, a diagnosis of catarrhal inflammation of the hepatic ducts and gall bladder was made. He was put on a prescription of calomel 0.065, soda bicarbonate 1, to be made in eight doses and one given every half hour. Milk diet and put to bed. Bowels moved twice; slate colored.

April 1.—Prescription of phosphate of soda 8 was ordered for three doses; actions still slate colored. Had some pain in lower abdomen during night.

April 4.—Feels better; jaundice not so marked; hungry; ordered two soft eggs night and morning; also prescribed elixir phosphates iron, quinine and strychnine 5 c. c. three times a day.

April 6.—Bowels have not moved for two days; feels fairly well; wants to get up; ordered prescription of phosphate soda 8 for three doses.

April 9.—Seems rather dull this a. m., but is easily roused and understands what is said to him; says he has slight pain in upper abdomen; takes eggs and milk readily.

April 11.—Very dull this a. m.; passes urine and feces in bed.

April 12.—Seems to be much weaker; has lost weight; jaundice increasing; examined liver again this a. m. and found dullness had increased downward about 1 inch, more marked in region of left lobe; not tender; in view of his general condition, marked jaundice and enlargement of liver, the question of cancer was discussed, but no positive diagnosis made on account of lack of important signs and symptoms.

April 15.—Very dull this a. m.; would take no food; jaundice deeper; pulse good; temperature in p. m. 37.8, only time it has been above 37.2, and that only three times; pulse throughout has ranged from 70 to 80; has been below 70 only three times.

April 16.—Patient died soon after sick call; jaundice very deep.

Necropsy (four hours after death).—Rigor mortis complete; slight degree of post mortem lividity posteriorly; body deep yellow, mottled with purple posteriorly; pupils dilated; general nourishment medium. Blood from incision; skull rather thin; membranes of brain not congested but deeply bile stained; brain normal, but deeply bile stained. Spinal canal not opened. Heart: Weight 240 grams; covered with yellowish fat. Pericardial sac contained about 30 c. c. yellowish fluid. Valves competent; left side empty; right ventricle contained small amount of dark blood. Aorta was normal; no thickening; other blood vessels normal. Costal cartilages softer than usual for the age. Trachea and larynx normal; cleft palate. Right lung: Weight, 415 grams; adherent to entire chest wall and the pericardium; pleural cavity was empty. Left lung: Weight about same as right; adhesions; pleural cavity empty; both lungs show hypostatic congestion; otherwise normal: the adhesions were numerous and very strong; lungs and pleuræ bile tinged. Bronchial glands dark and enlarged. Abdomen: On opening the abdomen, the right and left lobes of the liver are prominently seen, with the gall bladder bulging out between; left lobe extending to left ribs. Abdomen empty; peritoneum yellow; mesenteric glands much enlarged, especially in upper regions. Stomach half full of yellowish fluid; small intestine contained some gas; large intestine contained a few scybala; rectum filled with feces, soft. Liver: Dark purple with white cysts scattered over surface; weight, 3,200 grams; on section, greenish yellow, gritty, dark and white infarctions; small nodules of white material, some appearing broken down; the center of right lobe is very gritty on section: looks like that from yellow fever; left lobe is same but has more of a purplish tinge and shows more spots of softening; left lobe much more enlarged relatively than right; gall ducts throughout entire liver are distended and filled with greenish yellow bile; gall bladder very much distended and filled with thick, tarry substance, containing some few hard lumps. Omentum thin, congested, yellow. Spleen: Dark purple; weight, 250 grams; congested; cuts easily. Pancreas not weighed; normal. Kidneys: Left buried in fat; weight, 210 grams; capsule strips easily; on section, is congested; faint yellowish tinge of substance; normal; right same as left; weighs 205 grams. Pelvis and ureters, nothing noticed; bladder empty. Sections of liver were sent to Bureau for examination, and decided to be cancer of liver. Opinion as to cause of death: Death was due to cachexia, and poisoning by retention of bile.

Remarks: The peculiar features of the case were, rapid growth; patient only sick four weeks (i. e. unable to work); absence of marked cachexia; very moderate jaundice until just before the end; entire absence of vomiting or nausea; moderate degree of enlargement; no dilated superficial veins; and apparent improvement under treatment for a short period.

J. F. A.
R. D. M.

NEW GROWTH, MALIGNANT—COLUMNAR CARCINOMA OF
ŒSOPHAGUS.

O. H.; aged 58; nativity, Norway; admitted to the United States Marine Hospital, port of San Francisco, Cal., November 4, 1897; died January 8, 1898.

History.—Patient, when admitted, had been ill two months; he complained of difficulty in swallowing; pain referred to stomach; vomiting, and loss of flesh; he coughed a great deal. Examination showed no enlargement of any organ; sputum and urine were negative. The treatment was symptomatic and stimulative. Patient gradually grew weaker and died at 3.30 a. m., January 8, 1898.

Necropsy (eight hours after death).—Body is that of a very cachetic, emaciated, and poorly nourished adult; white; male. Rigor mortis is well marked. The skullcap, brain case, the sinuses, and vessels are normal. The membranes over the vertex of the cerebrum show evidences of a chronic meningitis. Brain, normal; weight, 1150 grams. The two layers of the pericardium are everywhere adherent. There is marked thinning of the walls of the right ventricle. The muscular tissue is soft, friable, and tears through upon attempting to separate the pericardial adhesions. Weight of heart, 350 grams. The pleuræ at the base of right lung show a few adhesions, and at the apex the parietal and visceral layers are adherent down to the level of the third rib. The lungs are normal except the apex of the right lung, which is infiltrated with tumor tissue by a direct extension from the œsophageal growth through the medium of the bronchial glands. Weight of right lung, 850 grams; left, 750 grams. In the walls of the œsophagus, about 8 cm. below the level of the cricoid cartilage, is an infiltrating mass of tumor tissue which involves all the coats of the œsophagus; it is ulcerated internally. The new growth is about $7\frac{1}{2}$ cm. in length. That portion of the wall of the trachea opposite the new growth in the œsophagus is infiltrated with tumor tissue for a linear distance of 5 cm., and a mass 3 cm. in length and 1 cm. in width projects into the lumen of the tube. The external wall of the descending portion of the aorta is involved. All the mediastinal glands are enlarged. The peritoneal cavity is normal. The spleen is normal; weight, 240 grams. Kidneys, normal; weight, right, 160 grams; left, 170 grams. The remainder of the genito-urinary organs are normal. The liver is normal; weight, 2,200 grams. The stomach is distended with gas; remainder of the gastro-intestinal tract is normal. All the organs show evidences of marked anæmia.

H. S. M.
R. R. H.
J. M. G.

Microscopical report.—Sections of the primary new growth show an infiltration of the œsophageal wall with small round epithelial cells. The mucous membrane of the œsophagus has disappeared and its site is occupied by broken down tissue. Section of the metastatic growth in the right lung show a similar condition. The air spaces are completely filled with epithelial cells, and the walls of the air vesicles are, in places, infiltrated. Diagnosis: Round celled carcinoma.

H. S. M.
R. R. H.
J. M. G.

SARCOMA OF VERTEBRAL COLUMN AND LUNG.

S. McD.; aged 22 years; born in Indiana; admitted to the United States Marine Hospital, St. Louis, Mo., January 24, 1898; died May 10, 1898.

History.—When the patient came to the hospital he complained of pain in his left scapula. He said he had had this pain for some time, and that it came on after

he had been exposed to a cold rain when at work. In July, 1897, he had had a number of ulcers on his penis, which were followed by suppuration of the inguinal glands of the left groin and small abscesses on his back and legs. Physical examination: Body well developed and well nourished. Papular eruption on legs, buttocks, and shoulders; a soft systolic murmur heard over the apex of the heart; no dullness on percussion over lungs; vocal fremitus not increased and respiratory murmur normal; tenderness on pressure over spine of left scapula. Amount of urine passed in twenty-four hours, 1,000 c. c.; acid reaction; specific gravity, 1015; no albumen or sugar. The patient was given iodides, which relieved the pain in his shoulders considerably, so that it troubled him only at night. On March 20, however, he complained of cough and pain under his sternum. His voice was hoarse and he said he felt weak and nervous. Upon examining the chest slight dullness was found to be present over the apex of the right lung; the vocal fremitus was also slightly increased and the respiratory murmur roughened. During the next month the patient gradually grew worse. He had pains in one shoulder, then in the other, under his sternum, and at the apex of his heart. April 20 symptoms of paralysis began to develop, and by the 25th his lower extremities were completely paralyzed. He had analgesia and anæsthesia below the level of the sixth dorsal vertebra. There was considerable stiffness in his legs, but the patella reflex was unaltered. He suffered from priapism, and he had complete retention of urine, necessitating catheterism to within two days of his death, when there was incontinence. His bowels were irregular, and when they moved they did so without his knowledge. A superficial bed sore formed over the base of his sacrum. He had an irregular fever, the temperature ranging from normal to 39°. His respirations were from 24 to 32 per minute. There was marked dullness over the apex of the right lung; vocal fremitus was greatly increased, and the respiratory murmur was bronchial in character and very much restricted on that side. Once or twice a day a profuse perspiration was present on the left side of his face and left arm, but on no other part of his body. His pains were severe until three days before he died, when they ceased to trouble him. There was no tenderness on pressure over the spinal column at any time. The patient gradually grew weaker and died at 10 p. m., May 10, 1898.

Necropsy (fourteen hours after death).—Height, 177 cm. Rigor mortis well marked. Posterior parts of trunk and legs a deep red color. Scar in left groin and several scars on legs. Bed sore 7 by 7 cm. at base of sacrum. An incision was made along the middle of the back and the spinal canal opened with a saw. A tumor 6 cm. in length was found lying on the right-hand side of the cord between the sixth cervical and second dorsal vertebrae. This tumor was of the same diameter as the cord to which it was attached. This attachment, however, was not very strong, as the two structures were easily separated. The tumor was firmly attached to the periosteum of the vertebrae. It was harder than the cord and of the same color. On section the internal surface was found to be a whitish-gray color. The cord appeared to be unaltered. An incision was made from the top of the sternum to the pubis. Abdominal wall 1½ cm. thick; contains a little fat. Stomach and intestines a whitish-gray color, filled with gas. Pericardial sac contains 75 c. c. straw-colored fluid. Weight of heart 370 grams; tissue soft and mushy. Length, 13 cm.; width, 12 cm.; breadth, 7 cm. Right ventricle wall 1 cm. thick; cavity empty; valves normal. Left ventricle wall 1½ cm. thick; cavity empty; one leaflet of mitral valve slightly roughened; aortic valves normal. No blood clots found anywhere in body; blood fluid. Left lung attached to chest posteriorly; weight, 385 grams, 20 by 14 by 7 cm., crepitant throughout; red color; on section dark fluid exudes. Bronchial tubes filled with pus and bronchial glands enlarged. Right lung attached posteriorly; weight, 1,100 grams, 25 by 17 by 7 cm. A large tumor 15 by 15 by 11 cm. occupies the whole of upper lobe. This tumor is nodular, hard in some places, soft in others.

On section it presents a white, glistening appearance. Lower lobes of lung soft, crepitant, reddish-gray color. Stomach 27 by 15 cm.; contains 125 c. c. dark liquid; mucous membrane of a grayish color, dark brown near pyloric end. Spleen 18 by 10 by 4½ cm.; weight, 380 grams. Internal structure black, mottled with brown. Left kidney: Weight, 237 grams, 15 by 9 by 3½ cm.; internal surface dark brown. Right kidney: Weight, 230 grams, 14 by 8 by 3½ cm.; color, same as left. Bladder contains small quantity of thick yellow urine; mucous membrane gray with minute red spots. Liver: Weight, 2,370 grams, 31 by 24 by 11 cm.; externally dark brown; on section brown, mottled with dark spots; gall bladder 12 by 4 cm.

W. G. S.

MALIGNANT NEW GROWTH—MELANITIC SARCOMA— PERICARDITIS.

A. O. L.: aged 44 years; nativity, Mauritius; was admitted to the United States Marine Hospital, port of San Francisco, Cal., on April 29, 1898, and died May 7, 1898.

History.—Patient was under treatment at this hospital from November 9, 1897, to February 23, 1898, for a series of new growths, malignant, then deemed adenocystoma, and which were apparently completely removed in four operations. He was discharged on the latter date at his own request, and renewed duty at sea. He returned on April 29, 1898, with large masses of tumors in both axillæ, and the back covered by pigmented nodules ranging from a pea to a walnut in size. The largest tumor—in the left axilla—had broken down, and was exuding a blackish semisolid, much of the appearance of wet snuff. On admission the patient complained more particularly of the pain at night and the inconvenience in exercise of the large masses embedded in the pectoral muscles near the axillary margins. His temperature, pulse, and respiration were but slightly disturbed. He, however, reported that his perspiration, always free, was now at times excessive. Realizing the extremely unfavorable prognosis, some empirical medication by gold and arsenic was attempted, with opium by the mouth, and locally to allay pain, and a generous allowance of easily digested and stimulating diet made. As the masses seemed to enlarge visibly from one visit to the next, on May 31 an injection of protonenoclein was made, 0.1 gram in each of the three largest masses. This was followed in a few hours by a rise in temperature to 39.05 C., which, however, subsided within twenty-four hours, and was succeeded by a profound depression, amounting almost to collapse, in which he died.

Necropsy (sixteen hours after death).—The body is that of a well-developed, well-nourished adult, white, male. On the right side, filling the axilla and extending to the mammary line, is a gangrenous area; that which is not gangrenous and sloughing is discolored and purplish. In the left axilla are several darkly colored tumors, the largest of which has broken down and is gangrenous and sloughing. Upon the back are a great number of small pigmented tumors, from the size of a pea to a walnut. Face and neck are much congested. The cicatrices of the former operations are plainly to be seen. Rigor mortis well marked. Encephalon normal. Weight of brain, 1,330 grams. The pericardial sac is filled with a straw-colored fluid and shows evidences of an acute inflammation. Heart is covered by large masses of fat, and in the right auricle is an organized blood clot. Valves normal. Weight of heart, 420 grams. Both the parietal and visceral layers of the right pleura are covered by a plastic exudate, while the layers of the right pleura are normal. Lungs are congested; weight of right, 770 grams; left, 493 grams. The peritoneal cavity is normal. Spleen is enlarged, congested, and exceedingly friable, breaking down upon the least pressure; weight, 260 grams. Kidneys are much congested. Weight of right, 180 grams; left, 140 grams. The remainder of the genito-urinary organs are normal. Liver is very much enlarged and is congested. Gall bladder distended with bile; weight of liver, 2,370 grams; the

rest of the gastro-intestinal tract is normal. The spinal cord was not examined. This case presents the following points of interest: The patient was an unusually fine specimen of physical manhood, and free, apparently, from syphilitic or other taint. At his first admission to hospital he had applied for dispensary relief for an abrasion of the skin of the leg, the examining officers' inquiry as to a fetid odor leading him to show an ulcerated mass between the scapulæ about the size of a small hen's egg, which had not inconvenienced him in the least. He was persuaded to enter the hospital for treatment. Second, the rapidity and deadly malignancy of the growth in an apparently unusually vigorous subject, and the fact that neither the pericarditis nor the pleurisy discovered by the necropsy were detected by the careful and frequent examinations made of the parts concerned during life.

R. R. H.

T. B. P.

J. M. G.

NEW GROWTH, MALIGNANT, CHONDRO-SARCOMA OF ILIUM.

B. J. M.; aged 38 years; nativity, New York; was admitted to the United States Marine Hospital, port of San Francisco, Cal., July 23, 1897, and died November 14, 1897, at 7.55 a. m.

History.—On entrance the patient complained of pain in his left side and left knee and of a swelling in his left inguinal region, which he says he first noticed one year prior to his entrance in the hospital. Physical examination showed a firm oval mass in the left iliac fossa, about 12 cm. in distance. It had apparently arisen from the left ilio sacral synchondrosis and lying behind the peritoneum, had grown downward, displacing the iliac artery forward and Poupart's ligament forward and downward. It was hard, absolutely immovable, and extended from the anterior superior spine of the ilium to the pubic bone and Poupart's ligament. He was given specific treatment without benefit. On September 29 an attempt was made to excise the growth. This was unsuccessful, owing to the firm, general adhesions present. He gradually grew weaker until his death.

Necropsy (four hours after death and limited to an examination of the abdomen).—The body is that of a well-developed, well-nourished white male. Rigor mortis well marked. Upon inspection there is seen an abnormal protrusion of the left lower quadrant of the abdomen. Poupart's ligament is displaced forward and downward and the upper part of the left thigh is swollen and tense, being 1.5 times the circumference of the right thigh. Just above Poupart's ligament there is an operation wound 12 cm. in length, running parallel to the ligament. From this wound foul pus is oozing. Upon section the abdominal contents are found to be normal, with the exception of the new growth presently to be described. On the left side, occupying the greater part of the left iliac fossa and inguinal region of the abdomen, is a tumor mass 14 cm. in its longest transverse diameter. It is retroperitoneal and arises from a broad base from the left sacro-iliac synchondrosis, pushing the posterior peritoneal wall forward and displacing the ligated stumps of the iliac artery veins, descending branches of the lumbar plexus and the psoas and iliacus muscle. The mass is everywhere adherent to the flange of the ilium, to the left side of the sacrum, and to the body of the pubes. The sigmoid flexure is displaced inward and upward, but there is no interference with its function. An incision corresponding to the operative incision in the parietics leads down to an area of necrosis and suppuration. Upon section the tumor presents areas of calcification and areas of typical chondro-sarcomatous tissue.

S. W.

H. S. M.

J. M. G.

CARCINOMA OF BACK—SECONDARY INVOLVEMENT OF LIVER AND OTHER ORGANS.

J. D.; aged 50 years; nativity, Ireland; admitted to United States Marine Hospital, Baltimore, Md., November 18, 1897; died March 1, 1898.

History.—About a year ago patient noticed what he took to be a small pimple over the left shoulder blade. It continued to grow until it was removed in July, 1897. About the 1st of October it returned, since which time it has steadily increased in size. It has never given any pain, nor up to this time has his general health been impaired. The growth has bled some at intervals. On admission to hospital a pediculated growth was found situated over the left scapula below the spine, and was at this time about 5 cm. long by 1.5 cm. wide. It bled readily when the dressings were removed for renewal. The axillary glands were also much involved. No involvement of viscera was found. The glands continued to enlarge and were at times painful. The superficial lymphatics of the body and left upper extremity were also becoming nodulated and prominent. Later on attacks of diarrhea and nausea, with loss of appetite, occurred. Pain in the right hypochondrium came on about January 1 and continued with increasing severity until death. The growth continued to increase in size until at the time of patient's death it was bilobed, the larger lobe being about 9 cm. in diameter and the smaller about 5 cm. in diameter. They were attached to the body by a common pedicle, which did not arise from the bone. Meanwhile the abdomen was growing tense and very tender, and the area of hepatic dullness greatly increased. About a week before death the signs of gastric disturbance increased; nausea, vomiting, pain, and tenderness increased in severity, and finally unconsciousness ensued, and the urine and feces were voided involuntarily, and patient lay in a restless delirium, in which condition he continued until death on March 1, 1898.

Necropsy (eighteen hours after death).—Body greatly emaciated. Indurated nodules in great numbers over abdomen, neck, back, arms, and some on the thighs. Rigor mortis marked. Upon opening thorax general lymphatic involvement is seen, covering the organs and serous sacs with miliary nodules, mostly of small size. Mediastinal and bronchial glands all enlarged and indurated. The same condition obtained in the abdominal cavity, all organs and their coverings being covered superficially with miliary nodules. The mesenteric glands were also enlarged and indurated. The muscular substance of the heart was flabby and some fatty degeneration was evident. Numerous cancerous nodules were found in the muscular walls of the heart. Large antemortem clot was found occupying the left ventricle and extending into the aortic arch. Mitral valve leaflets were roughened, other valves appeared normal. Organized adhesions between apices of both lungs, and parietes of thorax. Some firm basal adhesions of left lung to diaphragm and posteriorly on the right side. Both lungs deeply pigmented outlining lobules, and hypostatic congestion pronounced. Liver was enormously enlarged, weighing 6,910 grams. Upon opening the abdomen the liver was seen to extend from the level of the right nipple, at the highest point, to 2.5 cm. below level of anterior superior iliac spine. Its surface was covered with cancerous nodules of varying sizes, the largest being about 10 cm. in diameter, and the small ones less than a pin's head. On longitudinal section but little normal liver substance could be seen, the organ being a mass of these cancerous nodules. Adhesions between liver and all neighboring organs and tissues; substance of liver very dense and friable. Spleen was large and very friable. Large whitish-yellow patch of irregular shape and about 7 cm. in diameter, and firm adhesion to liver in this

location. Small, whitish, spherical nodule near lower edge of spleen and numerous smaller nodules. Pancreas small and nodular. Stomach empty and contracted; did not present any abnormality. Kidneys large, and pale in patches; right kidney considerably flattened by pressure of enlarged liver. Brain pale, but otherwise appeared normal. Other organs appeared normal.

C. H. G.

G. P.

CONTRIBUTED ARTICLES.

CONTRIBUTED ARTICLES.

The following articles relating to the work of the Service have been contributed by the officers named:

REPORT OF A CASE OF RAYNAUD'S DISEASE.

By Surgeon PARKER C. KALLOCH.

R. H. (colored); aged 24 years; nativity, Illinois; admitted to Marine Hospital, Cairo, Ill., December 28, 1897, for rheumatism. No history of previous illness; no history of any nervous affection in the family. About five weeks ago noticed the ends of the fingers getting hard. This trouble he attributed to cold, but the weather was not at all severe, and the right hand, which had been protected by a glove and in which he had not felt the cold, also became affected. At present all the fingers show the pointing from atrophy. The skin over the terminal phalanx on several of the fingers is whitened as from a blister and at the extreme end is hard and dry. Both hands perspire constantly; the left more than the right. Only two of the fingers show superficial necrosis affecting the soft tissues at the ends of the phalanges. Sensation at the ends of the fingers is much impaired and there has been considerable pain in the course of the disease. The fingers are always cold to the touch. When discharged from the hospital, January 29, the ulcerated points were healing slowly and there was very little if any improvement otherwise.

LOCATION OF BULLET BY X RAY—RUPTURE OF TRAUMATIC ANEURISM—ESTABLISHMENT OF COLLATERAL CIRCULATION AFTER DOUBLE LIGATION OF MAIN ARTERY OF LIMB—ULTIMATE RESULT IN DOUBT.

By P. A. Surg. R. M. WOODWARD.

Seaman, J. B., was admitted to the United States Marine Hospital, Cleveland, Ohio, November 4, 1896, with a gunshot wound of the thigh, the ball entering just above the inner aspect of the knee and being lost in the tissues. The injury was inflicted in another city several days before admission, the probe had been used, and the wound was infected. On November 5 the wound was enlarged under antiseptic precautions and the probe used, but unsuccessfully. On December 5 the temperature had risen rapidly and the part was much swollen. The incision was enlarged and the bullet wound traced directly through the condyle of the femur to the popliteal space, where a linear incision four inches long was made. Bullet not found. On December 22 another incision about 7 inches long was made and thorough search instituted, which was again unsuccessful. On December 31 an X-ray photograph was taken, locating the bullet in the popliteal space. The following day it was found lying beneath the deep popliteal fascia directly upon the popliteal artery, and removed. The ball had carried, embedded in it, a small jagged piece of bone, which had injured the popliteal artery, causing a traumatic aneurism as large as a cherry. As soon as the pressure was removed the aneurism ruptured, necessitating ligation of the artery. Good collateral circulation was established and all went well for nine days, when a secondary hemorrhage made it necessary to ligate the femoral, which was done at the apex of Scarpa's triangle. Collateral circulation was again established in a very satisfactory way, and no further hemorrhage occurred. The loss of blood made it appear advisable to inject a pint of normal saline solution, which was done by opening the median basilic vein. All of the wounds closed nicely except a sinus leading down to the canal through the bone, indicating caries. The patient could go up and down stairs and about the grounds without a crutch or cane. The caries caused trouble afterwards, and my successor, Surgeon Carmichael, was compelled to curette the bone. The patient's condition is not at this time satisfactory, as is shown by the following note on the clinical history, made by Surgeon Carmichael under date of July 10, 1897:

Present condition: The bullet wound in the lower end of the femur, which was curetted and drained on May 12, has not entirely closed. There is some discharge of pus from the popliteal space in the track of one of the exploratory incisions, and

the discharge can not be traced to any necrotic bone. The tissues of the limb in the vicinity of the injury are of low vitality, and the physical condition of the patient is not good. It is probable that amputation through the thigh may yet be necessary in this case.

While the patient may ultimately lose the limb, the interest centers in the fact that a collateral circulation could be established in a limb the main artery of which had been ligated twice within nine days, the two points of ligation being 9 inches apart, and that the limb could be used in locomotion for at least eight months.

ANTHRAX ŒDEMA.

By P. A. Surg. W. PAGE McINTOSH.

J. S. (white); aged 34 years; robust and strong, was admitted to wards of United States Marine Hospital, Boston, Mass., March 23, 1895. In his personal history the man says that he has not suffered from syphilis or gonorrhœa, but has enjoyed good health up to a short time since. About eighteen months ago he worked on a tramp steamer which carried hides from South American ports; since that time he has worked on ordinary sea-going vessels, fishing schooners, etc. About three weeks since a swelling appeared, first on the side of his neck, but gradually extended across in front of neck on both sides of median line. At present this swelling about corresponds to the thyroid body. This enlargement is only slightly painful, but is somewhat tender on pressure. The patient says that he has been in one or two hospitals recently, but no one could make a diagnosis and "he does not think anybody knows what is the matter with him," an opinion in the correctness of which the present medical attendant fully concurs. About one week ago his throat became sore and he had slight fever at night. There seems to be no tendency to suppuration at present. Iodine tincture was painted over swelling and iodide of potassium given internally.

March 29.—The swelling is about the size of a navel orange, is more painful and the patient does not feel well; temperature, 38.5° C.; attempted to aspirate the enlargement, but did not succeed in withdrawing any fluid.

March 30.—Patient feels much more comfortable; pain in head better; temperature, 38° C.

March 31.—Swelling œdematous, painful, red, and boggy.

April 1.—Incised at site of former puncture to let out blood.

April 2.—Opened up in median line with curved bistoury and evacuated some little pus; put in drainage tube; dressed every four hours with hot bichloride pack; temperature, 38.5° C. The suppurative tendency is entirely too limited for phlegmonous inflammation, nor is there a sufficiently rapid disintegration of, and liquefaction of tissue for malignant œdema.

April 3.—After incising swelling yesterday a portion of the blood and pus withdrawn was mounted on cover slip and examined under microscope, Gramm's method of staining being used. The examination revealed large numbers of bacilli, corresponding in every way, morphologically, to the *Bacillus anthracis*. As, owing to its location, it is not possible to cut out or scrape away the infected tissue, it is freely

injected with hydrogen peroxide and dressed frequently with a 10 per cent solution of carbolic acid. Evening of 3d the temperature is 37.5° C.; tissues around wound gangrenous and separating; surface covered with blebs filled with bloody serum. Ordered whisky, purgatives, and tonics.

April 5.—Examination of fresh cover slip, prepared from excretions from deeper portion of wound, shows only a few bacilli; patient improving; cover slips prepared on the two succeeding days gave negative results; no inoculation experiments were made.

April 8.—Patient very weak; pulse thready; stop carbolic acid.

April 11.—Patient is doing well, but pulse is rapid and rather weak; very little discharge from wound.

April 17.—Still improving.

April 21.—Removed drainage, though cavity is still quite extensive from slough. Case discharged, recovered, May 7.

The source of infection in this case is rather obscure. It would seem to be straining a point to suppose that the man had carried the infection in his baggage for eighteen months. The bacillus of anthrax requires air, but a small quantity is sufficient; freezing does not destroy its vitality; drying up kills the bacilli, but not the spores; spores once formed are very tenacious of vitality, they are not formed in the body of the animal, and if this be buried at once, intact, it is quite probable that spore formation is prevented. Pasteur's supposition that earth worms carried spores from buried animals to the surface has not been confirmed. Spores are formed whenever any animal secretion or blood containing bacilli comes in contact with the air immediately after the death of the animal. How long the spores can retain their vitality it is impossible to say, but certainly from one year to the next,¹ that is to say from one season to the corresponding season of the next year, and there is no reason to suppose that if they can live twelve months they can not also live eighteen months.

This man's clothing could have easily become blood stained, and the spores could have been carried quite a long time before the clothing was again worn or an opportunity for local infection presented, since this spore remains for a long time without germinating (op. cit.).

The location in the neck is the most common. Of 63 cases of anthrax in man, collected by Slessarewskji,² the disease occurred six times on the face, twenty-one times on the neck, and thirty-six times on other places.

In the case of Kaloff, of St. Petersburg, referred to by Senn, who accidentally infected himself, the local infection occurred on outer side of thumb of left hand as a small vesicle, and notwithstanding the removal of the indurated tissues promptly by excision, the axillary glands were swollen on the second day, attended by fever, great pros-

¹ Payne, Gen. Path., p. 490.

² American Journal Medical Sciences, 1887. Surg. Bacteriology, p. 206.

tration, and diarrhea. The skin over axillary region and chest became oedematous, and at different points became bright red, at others bluish. The enlarged glands were removed and the field of operation disinfected with carbolic acid and the same solution thrown into surrounding tissues with hypodermic syringe; the man recovered. This, then, would seem to be the rational therapeutics for local anthrax when excision is or is not practiced. General infection by this bacillus is probably always fatal.

OBSERVATIONS, COMMENTS, AND STATISTICS ON THE DIAGNOSIS,
CLIMATIC ISOLATION, AND FUTURE CONTROL OF THE CON-
SUMPTIVE SAILOR.

By P. A. Surg. J. O. COBB.

By reason of his peculiar and nomadic habits of life the sailor is the bearer of many ills and pains, which he endures as a rule with complacency and indifference. In none of his trials are our sympathies so highly aroused for this man, without home or friends, as when he becomes the subject of pulmonary tuberculosis. The average sailor looks lightly on hardships, diseases, and infirmities brought about, probably, by his own utter disregard of the common laws of health; yet when he has to face the positive fact that he is consumptive (and his experience has already taught him that it is sure death among the seafaring class), I have yet to see the man, even the most stolid, who did not show considerable feeling when told that he would be a confirmed invalid—that he was to die by inches without a chance to fight for his life. Certainly no man can view with complacency the certainty that he is to become a hopeless and helpless invalid; nor can any man view with utter indifference the undoubted surety that his death is near and certain. So sure is the sailor that there is no chance of recovery from consumption, that he gives up all hope of life as soon as the diagnosis is made and settles down at once to make the best of the inevitable—and without doubt it is the inevitable. It seems hard and cruel to bluntly tell men what is to be their fate, and yet it is positively necessary, from the very nature of things, that they be told all about the disease and its dangers to themselves and others.

Officers do not and can not look lightly upon this condition of suffering of the seafaring class, the class that is now making and that will continue to make the history of this country. It is not in human nature for one to remain content under conditions which are certainly very discouraging to the patient and his medical officer in attendance, and a discussion of the troubles, trials, and dangers brought out in administering to this class of patients may prove interesting if not instructive. There can be no use in denying that we dread to treat these cases, for they are trials to the officers, loathsome to other patients, and disgusting to themselves. I have seen officers daily come from the consumptive wards depressed and discouraged. I have come from these wards in Chicago and New York bitter and sad, feeling that such conditions should not be.

Many sympathetic officers, in the goodness of their hearts, being unable to do these poor, unfortunate men any permanent good, give them whatever they may fancy or desire as food and delicacies. There

are many kind-hearted officers; there are numbers of excellent diet lists filled up for these men to tempt their ever-ebbing appetites; but still the consumptive sailor dies just as soon and just as surely under one man's treatment as under another's. It is a sad fact that we are not curing these cases and our results are bad, though we probably get as good or better results than civil hospitals in the same climates.

WHY THE RESULTS ARE BAD.

There can be no doubt that the results are very bad, and principally from three causes: (1) Overcrowding; (2) the poorest of climatic conditions at all of our stations where there are hospitals; and (3) from the fact that the disease is rarely diagnosticated in the first stage, the only time when treatment might prove efficacious even in a poor climate.

OVERCROWDING.

When it becomes necessary to put consumptives in wards with patients suffering with other diseases then a serious error is being committed, and the defect of a hospital which makes such a condition necessary should be quickly remedied. That such conditions do arise in many of our hospitals is unfortunately true. It is also true that consumptives have been put in with other patients to save the expense of heating, lighting, and administration of large wards, when there were only a few consumptives on hand. Putting consumptives with other patients has been officially prohibited by the Surgeon-General.

Many of our hospitals have been built on the pavilion plan or with long wards. They were constructed without regard to isolation of any class of diseases, and so it is that—using Chicago as an example—these cases, comparatively few in number, can not be segregated, except in very large wards, which are too large for economical administration. Similar conditions exist in other hospitals, and thus it becomes a temptation, when there is lack of room for other patients, to economize and put the consumptives in general wards, but this should not be done.

EFFECT OF CLIMATE.

One cause being pointed out for the great mortality of these patients, it may be of interest to examine the statistics in regard to the outcome of the disease as treated in hospitals in different parts of the country, showing effect of climate on the disease.

It has long been known and granted that mere equability of climate is of little, if any, benefit to the consumptive. There are few climates at the sea level that are not subject to rapid changes in temperature and humidity. None of our hospitals are situated in dry climates, though several stations have heat enough, and all are humid and saturated. It is probably true that a moderately cold and dry atmosphere at high altitudes, without wind and great temperature changes, is the best for the consumptive. Such a climate is hard to find, and for many reasons would not be attractive as a subject for this paper. The next

best climate is the dry, warm atmosphere in moderately high altitudes, and is the one best suited for a marine-hospital sanitarium. The very worst of all climates is the hot, humid, saturated, devitalizing atmosphere at the sea level, which saps the strength and life of these patients in so short a time. We have no station where there is a hospital that would in any way answer the necessary climatic requirements for the consumptive sailor.

It will now be interesting to study the following tabulation of figures, and it will be well to bear in mind that it is necessary to avoid several sources of error in compiling such tables from the annual reports.

MORTUARY TABLES.

One of the greatest errors that will readily occur to officers is the fact that one person suffering with consumption becomes during the fiscal year probably two or three cases of consumption. These men come and go, being reported as new cases each time they enter the hospital, thus lowering the percentage of mortality by increasing the number of cases.

A study of the mortuary tables of the service for a number of years shows that the mortality is as great at the sea level in one district as in another, regardless of equability of climate. The percentage of deaths from 1880 to 1895 is 22.4, and from 1873 to 1877, 21.5.

Percentage of mortality among cases of tuberculosis from 1880 to 1895, inclusive, arranged by districts and in periods of five years:

	Per cent.
From July, 1880, to July, 1885:	
North Atlantic.....	19.2
Middle Atlantic.....	24.3
South Atlantic.....	19.3
The Gulf.....	30.1
The Ohio.....	24.9
Mississippi.....	27.4
Great Lakes.....	14.9
Pacific.....	23.5
From July, 1885, to July, 1890:	
North Atlantic.....	13
Middle Atlantic.....	26.3
South Atlantic.....	24.3
The Gulf.....	26.2
The Ohio.....	19.2
Mississippi.....	22
Great Lakes.....	12.4
Pacific.....	24.9
From July, 1890, to July, 1895:	
North Atlantic.....	18.3
Middle Atlantic.....	22.7
South Atlantic.....	26.7
The Gulf.....	25.1
The Ohio.....	22.7
Mississippi.....	21.6
Great Lakes.....	16.5
Pacific.....	25.4

EARLY DIAGNOSIS.

The early diagnosis of the disease in the seafaring class is a subject the great importance of which, I believe, does not sufficiently impress us in the Service. Too many of these cases are overlooked in the haste of dispensary practice, and obscure cases with coughs are allowed to run on and on until it is possible and imperative to make the diagnosis by means of the microscope—the diagnosis seeking us, being forced on us, in fact. Every cough that has shown any disposition to continue after ten days' treatment should be looked upon with suspicion. All patients with coughs deserve thorough chest examination, and if there is expectoration, then use the microscope. If the bacillus is not found, do not be too sure even then that your patient is free from infection. If a chronic and a persistent cough proves not to be due to tuberculosis, it is more often found to be caused by granular pharyngitis rather than "chronic bronchitis."

We ought to be exceedingly careful in dealing with chronic coughs, for I fear that we are treating many cases as bronchitis that should be classed and diagnosticated as consumption. Turning to the annual report of 1895, as an average year, we find that 3,308 cases of acute, 558 chronic, and 81 cases of catarrhal bronchitis were treated. Of this number, 92 cases of chronic bronchitis were treated in hospitals, 28 of which are reported recovered (30.4 per cent), 46 are reported improved (50 per cent), 8 not improved, and 4 died. A guess that over 50 per cent of the chronic bronchitis cases were tuberculosis pure and simple would probably not be wide of the mark.

A thorough examination ought to mean that the patient be divested of all clothing covering the chest, and the thorax gone over inch by inch. I can not but look with suspicion upon the diagnosis (or the nondiagnosis, for that matter) of the man who uses his ear only, and that separated from the chest wall by clothing. When the physical signs of consumption can be easily detected through clothing by the unaided ear, then the disease has become seriously advanced and can not be checked except by heroic treatment.

Writers refer to the first stage of the disease, meaning that period from infection to the date at which the bacillus can be found in the sputum. There are certainly many physical phenomena during the development and transition of this stage to aid one in making a fairly accurate diagnosis even before the bacillus can be found and before there is expectoration. That the disease is diagnosticated in this stage I believe to be rare.

If we could make a diagnosis before the bacillus has broken free into the air spaces of the lungs, and is found freely in the sputum, much good would result to the patient, and also probably prevent him from infecting others.

There are many symptoms which help the observing physician in making a diagnosis in this stage, and I trust that I may be pardoned

for pointing out and emphasizing a few which have been of most value to me.

The general appearance of most of these patients is characteristic and peculiar, and if one notes closely the facies many cases can be pointed out in that manner alone. The red lines on the gums, as pointed out many years ago by Frederieq and Thompson, is a very valuable sign, but it has not always been present in cases under my observation. There is usually a change in the timbre and pitch of the voice, even when there is no cough. Loss of weight usually comes early, the chest wall being the first part to show emaciation. In this stage percussion does not help one much, for it is next to impossible to detect a flattening of the percussion note; but in auscultation we have one of the surest aids to diagnosis—that is, to this date, and until the radiograph is further perfected.

That a diagnosis can now be made in the early stage by the radiograph is undoubtedly a fact. Much good work is now being done in making out cases in which physical signs are too obscure to be made out by ordinary diagnostic methods.

If one will bear in mind to seek for the first and initial lesion in the pleura, it will be surprising how often the disease can be first located as a small area of dry pleuritis. I believe that a large majority of tuberculous infections first involve the pleura, and that the first manifestation of the pathological condition is a small area of apical pleuritis without effusion, eventually resulting in agglutination of the two pleural surfaces and subsequent infection of the lung at the point of contact.

The following quotations from Whitney, *Twentieth Century Practice*, vol. 7, page 11, will show some figures collected to point out how frequently tuberculosis follows serofibrinous pleuritis:

If it can be shown that a considerable proportion of those who have had one or more attacks of serofibrinous pleurisy subsequently develop a distinct form of tuberculosis, the evidence thus afforded must be allowed to be of incontestable value. It must also be granted, as is so strongly insisted upon by Netter, that negative statistics have but little worth as against even a small amount of positive evidence; there are so many possible sources of error when, for example, it is stated that of a given series of effusions nearly all of the persons have continued in perfect health. The following are some of the most careful observations as to the subsequent history of pleuritis: Handford reports 5 cases of effusion in apparently well subjects, 3 of whom afterwards became tuberculous. Fields had 112 cases, of which number 25 subsequently died of tuberculosis and 65 became tuberculous. Barris ascertained in 1890 the condition of 57 cases treated at the infirmary of Leeds from 1880 to 1885; 21 had died of tuberculosis. Bowditch investigated in 1889 the subsequent history of 90 patients, treated for effusion by the elder Bowditch from 1849 to 1879; 30 had died of tuberculosis, and at least 1 of those still living was tuberculous. Recochoh was able to follow carefully 32 cases of pleurisy in private practice; tuberculosis developed sooner or later in all but 1. * * *

Many similar series have been reported. Those selected, while showing a far greater percentage of tuberculosis than many others, are at the same time the most trustworthy at command. They represent cases seen in both hospital and private

practice. Taken together they give a total of 310 cases of pleurisy with 178 instances of subsequent tuberculosis, or 57 per cent. This is probably above the truth. * * *

Probably all pleurisies without effusion are due solely to infection with the tubercle bacillus. Necropsies on old tuberculous cases, when there is extensive pleuritic inflammation, rarely show effusion.

The portion of the pleura involved is usually that part above the third rib, and the patient can usually designate a point which is painful on pressure. On listening over the infected area, have the patient take a very deep inspiration, and hold the breath as long as possible. He will be unable to entirely suspend expiration, and one will then hear if there is pleuritis, without adhesion or effusion, a far-away roaring sound, something like the hum of machinery or the "waterfall" sound. The true pleuritic friction sound is altogether different. A very full inspiration and gradual expiration also produces a muffled sound in health, and must not be confused with the other. The early case also has a jerky expiration. To obtain the sounds perfectly the lungs must be fully distended, and the sounds referred to are produced by the inflamed and roughened pleural surfaces slowly and continually sliding over each other during gradual expiration. If there has been agglutination of the two pleural surfaces or there is a small sacculated pleurisy or lymph deposit one will not hear the waterfall sound in gradual expiration over that part. I rely a great deal on this symptom in making a diagnosis in the early and obscure cases.

Of course all are familiar with the sounds caused by destruction of the alveoli, due to perialveolar deposits of tubercles. Here the harsh, blowing sounds, or the gurgling of mucus, with absence of vesicular breathing over that spot, is itself of enough importance to justify a confirmatory diagnosis.

Another great help in ferreting out the disease in the early stage is the continuous temperature chart. I would advise against relying on the morning and evening reckonings alone, for while the chart made up this way will be valuable it will often be more helpful if the notings be made between 1 and 4 o'clock in the afternoon, or sometimes between 11 and 3 o'clock. If the daily curve shows a constant subnormal or a constant rise of temperature the case is very suspicious, and must be immediately differentiated from the few other diseases that might cause the notings on the temperature chart.

Examination of the blood will be of great value, though not determinative, as the abnormal conditions found at this stage are noted in other diseases. The percentage of hæmoglobin should be taken and a blood count made as matters of routine. If the percentage of hæmoglobin is quite low, the count low, and there is a leucocytosis, then we could exclude tubercle of the lungs in the early stages before it has become possible for a mixed infection. Holmes reports in a series of examinations that there is no leucocytosis in the early stage, and Cabot says there is no leucocytosis until there is a mixed infection or just

after a hæmoptysis. Another author states: "Johnson's observations were made on patients in the advanced stage of the disease, with cavities and at times hæmoptysis. The observations were made before meals, and no attacks of hæmoptysis occurred between the first and second examinations. Of the 33 cases, 25 were found to have leucocytosis—i. e., the white cells ranged above 7,500 per cubic millimeter. The 25 having leucocytosis also had cavities. Nine of the 33 showed a red-cell count of 5,000,000 or above, which, according to Cabot, was a normal basis. The remaining 24 showed a red-cell count in many instances far below 5,000,000, and in no case was the hæmoglobin up to normal. In only one case did it reach 75 per cent."

In the *American Journal of Medical Science*, June, 1898, the significance of eosinophile cells in tuberculous sputum, is set forth in the following interesting note:

Teichmüller (*Centralblatt für inn. Med.*, 1898, No. 13) calls attention to this as the result of the examination of 153 patients. In all of these eosinophile cells were easy to find in the sputum months before bacilli could be found, according to the author. The occurrence of these cells points to an attempt at defense on the part of the organism, most evident in fairly strong individuals, and not so certain in anæmies and cachectics. In recovery, the gradual increase of eosinophile cells is always notable, and a diminution in their number at any time indicates relapse or, if the fall is rapid, quick consumption.

If there is any doubt in my mind about the diagnosis of a case I have no hesitation in giving test doses of tuberculin. I believe it to be a positive diagnostic agent, practically free from danger, and a perfectly justifiable procedure.

Only the early cases have been mentioned so far—the class of patients rarely seen by us—for these men usually do not come for treatment until there is a cough and expectoration and when the disease is quite well advanced. But even when there is profuse expectoration the case is often not clearly made out at the time, and is put down as "acute" or "chronic" bronchitis.

THE BACILLUS SHOULD BE CAREFULLY SEARCHED FOR.

I think that these mistakes sometimes made in the beginning of the treatment (but of course eventually discovered) are due to the fact that the bacillus is not properly looked for or correctly stained, and therefore not found under the microscope. If we will assume the position that ninety-nine chronic coughs out of every hundred are due to tuberculosis, then we will search for the bacillus until it is found. Even a chronic bronchitis should be cured in a comparatively short time, and if one of these cases persists we should by all means keep such a patient away from our hospitals, where he will not be exposed to tubercular infection. All patients with cough and expectoration are surely better outside our hospitals than in them.

STAINING THE BACILLUS.

I think the text-books pass too lightly over the methods and difficulties in finding this bacillus. Even in the laboratories only the typical bacillus is shown to students. The bacillus of the early stage is quite a different looking bacillus to that of the chronic, partially arrested case. In the former stage the bacilli are larger and longer, of various shapes and sizes, including the branching forms; while in the latter stage they are uniformly small, of a given shape, and fade out and stain uniformly. One can differentiate the chronic from the acute case by means of the microscope alone. As most of the microscopical work falls to the lot of the younger officers, I feel that it will not be out of place to refer specifically to some of the points and difficulties that I have found in dealing with the bacillus and sputum, for it is the little things that bother us most. Taking, therefore, a given specimen of sputum, it is not always an easy matter to demonstrate the presence of the bacillus positively. Especially is this true of the early infection, where we find the bacilli in varied shapes and sizes, some not stained, others taking the counter stain only, or, as is often the case, taking the stain poorly, if at all. It requires considerable practice and experience to always positively demonstrate the organism in the early cases. Any one should be able to show the bacillus in a typical case in the chronic stage.

SPREADING THE SPUTUM.

In dealing with the sputum it is well to discard the use of the cover glass entirely, for much annoyance will be saved by staining the sputum on the slide. To work rapidly and without irritation, I would advise one to discard the oese and cover glass and take instead a stiff probe and the slide. Out of a mass of thick tenacious sputum it is very difficult to extricate the desired portion of sputum with the oese because of the flexibility of the platinum wire, but it is not so difficult with a stiff probe. After placing the sputum on the under slide, take another slide and place it down upon the sputum, holding it in the opposite hand. Press the two slides gently together and draw the top slide slowly over the surface of the under one. More or less of the sputum will adhere to each slide, and the maneuver can be gone through a number of times, making a beautiful, thin, uniform spread, which is easily dried in the flame, and which will not wash out. At the same time we make two specimens for staining. This is a very desirable thing to do, for I have often failed to find a single bacillus on one of the slides made in this way, while the other was loaded with beautifully stained bacilli, though both specimens were treated alike.

Sputum that is very frothy can be fixed by this method easily. I have found colonies of bacilli in clear, frothy fluid, in which it was impossible to detect, with the unaided eye, any sign of thickened sputum or pus.

STAINING METHODS.

I have been working more or less with the bacillus for a number of years, with constantly increasing interest. During this time I have tried every method of staining I have seen in medical publications. I used Friedlander's method a long time, and to the exclusion of other methods, as I got better results with it; but I now think the most satisfactory stain is Gabbets', modified to suit different cases. It is equally effective in the early and the chronic stages, though the bacillus in the early stage is never satisfactorily stained with any method, as the contrast color of the large bacilli will be modified by the counter stain no matter how careful one may be. It is well to use less acid in the Gabbets' in examining the sputum in an early case. I use as contrast stains both the Gibbes and the Friedlander methods. Both of these are good and rapid in action, but they require more care and practice than Gabbets'. Do not depend on Gibbes' method in the early stage or doubtful case; do not expect to find typical red-stained bacilli in the early stage, as they are partly decolorized and look purplish.

MANAGEMENT OF THE CONSUMPTIVE.

This leads us to the consideration of problems for the improvement of our methods of treatment and management of the consumptive, if we must have him in our hospitals, together with the benefit to the patient to be derived along the lines of proposed climatic isolation.

Now, if it be necessary to have the consumptive in our hospitals, let us do the very best possible by him, and at least prevent him from infecting others. For over twenty years we have figures which show that the percentage of deaths is as great now as at any time in the seventies or early eighties. The mortality for the years from 1873 to 1877 (the only data at hand) was 21.5 per cent; from 1880 to 1890 it was 21.9 per cent, and from 1890 to 1895, 23 per cent.

Conclusions based upon statistics are not always weighty, but these figures, to me at least, are humiliating. The mortality by districts in the early eighties is no greater than in the nineties. What have we of the creosote habit to show as improvement over the results of older officers? Probably nothing more than the attenuation of our cases—a prolonging of life with the possible greater dissemination of the disease. That the virulence of the tubercle bacillus can be attenuated is undoubtedly true; that some persons are more subject to infection, while others have greater resistance, is also true. Let us of the junior officers be not puffed up with pride over the suppositional outcome of our cases, over the percentage of our cures, over our advanced knowledge in the diagnosis, treatment, and management of these cases, until we can show better figures to prove that it is really so and that we are curing more cases.

Notwithstanding the personal efforts of the Surgeon-General, the sanitary spit cup purveyed by the Bureau has not been generally used

in our hospitals. Some hospitals have not used them at all, and some only for consumptives. If a patient must expectorate, give him a cup or the sanitary sputum bottle when on the grounds. When these men must have mosquito bars around their beds, some special provision should be made for frequent changing. Can one conceive a better disseminator of dried sputum than the mosquito bar? The pillows and mattresses should be made sterile by steam quite often. These articles get foul with sputum, in spite of all care, and the making up of such a bed certainly sets free enough dried sputum to infect a whole ward. It is next to impossible to have bedding free from danger unless we have the apparatus to properly sterilize it. Some patients are allowed to wear the mustache and beard, which soon become foul with dried sputum, infecting others and reinfecting themselves. A little persuasion and explanation will be successful in getting men with beards to remove them. Patients should not be allowed to use handkerchiefs, but instead pieces of sterile or clean gauze. These, after using, should be placed in a receptacle for the purpose, and must be destroyed daily. No consumptive should be allowed to chew tobacco, for such a patient will surely expectorate at random. The consumptive patient should be compelled to carry his spit cup or sputum bottle with him whenever he goes to sit out of doors. Many of our hospitals and grounds in the service are undoubtedly infected by dried sputum, and the possibility of infection from these foci is constant and probable. That our hospitals are responsible for the infection of some of our officers and men, to say nothing of patients treated for other diseases, can not well be denied.

The tabulation and statistics of the consumptive should be properly made. There are many experiments that might be made in the study of the disease. For example, the advanced workers in consumption have almost positively worked out the nonheredity of the disease. We could study the blood changes in different stages of the disease and under the action of different serum treatments. Each hospital could make a special annual report covering many points of interest in diagnosis, administration, and treatment. It is a disease that must be studied from many standpoints, in different climates, and under varied treatments. If the study of the disease were taken up seriously by a number of officers and a definite plan of action adopted, the Bureau could afford to be most liberal for special scientific apparatus for investigation, and would allow great latitude in the therapy with the multitudinous treatments now known. What body of men can possibly have such great opportunities in working out the many problems of this disease as the officers of the Service?

SANITARIUMS.

Now, then, we must consider the subject from a still more practical point of view, and that is the study, management, and isolation of these cases in sanitariums in proper climates.

Three officers of the Service have written articles advocating the removal of tuberculous patients to sanitariums in the South. Other officers have from time to time made comments and suggestions in regard to these cases. With all the discussion that has gone on, I believe no one has seriously considered the great difficulties in the way of establishing colonies, farms, or sanitariums for tuberculous patients.

The first and foremost difficulty will be in obtaining favorable Congressional action. I fear that this will be the hardest part to overcome, for such legislation is rarely obtained unless it can be shown that it is in the line of economy. As an immediate economy in dollars, it will be hard to show that money can be saved. The eventual saving of life will hardly be a factor in such consideration.

We shall always have trouble with the sailor and his friends and relatives in sending him far away for treatment. He would probably procrastinate until he had become an incurable case before submitting to removal. All who have had any experience in treating the negro race know that the negro will refuse to go to any place away from his relatives and friends. He prefers to die at home, out of the hospital, where he feels certain no post-mortem will be made upon his remains. Comparatively few consumptive negroes die in our hospitals.

The only other serious difficulty will be the expense of transportation, as pointed out by the Surgeon-General in his annual report of 1895, page 143.

To get Congress to pass the necessary legislation for the establishment of sanitariums for this purpose it will be necessary to show that the difficulties, after all, deserve no consideration in comparison with the eventual good to the public at large and to these suffering patients. It is not to be doubted that if necessary the Government would send a whole fleet to foreign lands to save the life of one citizen when matters of state were concerned. And yet I doubt if Congress can be brought to see that hundreds of lives can be saved merely by placing these men in favorable climates, possibly saving in actual annual outlay, or, at any rate, costing only a comparatively small amount more for their transportation and care in these sanitariums.

Laying aside, then, all hope that Congress may look at the matter merely from humanitarian motives, let us see how good a showing we can make with figures in saving money in the treatment and care of these cases. It is from this standpoint alone that we need expect help.

During 1895 there were 531 cases of "tubercle" treated in hospitals. The actual number of persons would probably be something more than half this number, and the average period of treatment would surely be 150 days for each person. For the same period, out of the above-mentioned 531 cases treated, there were 283 discharged improved, a percentage of 53.3; or, to put it in another and more probably correct way, 53.3 per cent of patients previously discharged had returned for treatment. The average cost of the hospital ration is close to \$7.50 a month.

Of course we know that the cost of feeding the consumptive is much above that figure: nevertheless, not counting the cost of medicines and administration, the Government expends \$36.50 once each year, to say the least, for the subsistence alone of the consumptive case.

As previously pointed out, the actual number of consumptive persons represented by the number of cases (531) would hardly be 300. Taking that number, the cost of their transportation would be \$10,230, and the cost of feeding them in hospitals would be \$10,950.

Five months in the hospital, as an average for these cases, seems quite high, but if we turn to the tables we shall find that, taking all classes of diseases, the average number of days in hospital is over thirty. It can hardly be doubted that the consumptive is with us five times as long.

As previously stated, the actual number of persons represented by the number of cases (531) would not be above 300, for we know that the consumptive goes in and out of our hospitals a number of times each year, thus confusing the reports and at least doubling the number of cases.

COST OF TRANSPORTATION.

But following the records strictly, let us again take the year 1895 as an average year, and see what it will actually cost to transport these men to designated points. (The railroad fare here given by districts is in round numbers and, approximately correct.)

For stations by districts to points in western Texas or New Mexico, based on annual report, 1895:

District.	For each person.	Number of patients.	Total.
North Atlantic.....	\$60	45	\$2,700
Middle Atlantic.....	45	122	5,490
South Atlantic.....	25	60	1,500
Gulf.....	15	45	675
Ohio.....	30	38	1,140
Mississippi.....	25	37	975
Great Lakes.....	35	108	3,780
Pacific (to points in southern California).....	25	76	1,900
Total.....		531	18,110

Average cost of transporting each patient, \$34.10.

Of course some one may explain that this does not answer the question strictly from an economical standpoint, for, while the consumptive receives five months of hospital treatment, at the sanitarium or home he would be a charge for a whole year, thus running his expenses for subsistence, on the same basis, to \$81.25 for the year; or a total cost of \$43,143.75, for the total number of patients, viz, 531. Granted, but the answer, roughly speaking, aside from other economical questions which could be presented, is that the patient at the sanitarium would cease to be a charge probably in two years, while the patients at our stations are at least three times that long, making the eventual cost more. It

will also be pointed out that the patient will have to be subsisted at the sanitarium just as well as at the hospital. Very true, but anyone must know that such a place properly cared for would be practically self-sustaining for subsistence, while the patients at the sanitarium will cost very little for medicines and attendance. Furthermore, we know that the consumptive when not being treated at the hospital is, nevertheless, a constant care and expense to the Service, because of the treatment furnished at the dispensaries. Now that we can clear out our hospitals and transport the consumptive to designated points and possibly save money thereby, let us pursue the question further. Where shall this designated point be? What climate is best? What altitude is most suitable?

For our present purpose this question need not be discussed, or, if it is to be considered, the article bearing on this subject by P. A. Surg. W. D. Bratton (deceased) in the annual report of 1895, page 150, furnishes very good data.

For the present let the good to be gained be presented in as clear a light as possible from the data at hand and the details become unimportant. Suppose, now, to start the arrangement, that Congress appropriated \$50,000 for the necessary building, stocking the land, and putting on water for irrigation. That seems a small sum, and yet much can be done with it. I am assuming, of course, that the necessary Government land can be set aside for the purpose. With this amount to begin with, and a small appropriation annually, such a place can be made an ideal home, and will in a short time become practically self-sustaining.

The land should be suitable for farming purposes. This would be advantageous in lowering the cost of the ration, for on such a place all the fruit, vegetables, eggs, poultry, milk, and butter could be produced, while the light work required of the convalescent patient would benefit him and lower the cost of administration.

RELIEF OF HOSPITALS FROM OVERCROWDING.

Now, we must not look at such a home too narrowly for facts of economy, but rather to the indirect saving to our hospitals. To obviate overcrowding by consumptives and chronics it has been necessary from time to time to build new hospitals or annexes to care for these cases. If we remove these cases, no further expenditures will be necessary, so long as American shipping does not increase. The buildings needed for such homes will, for scientific reasons, be inexpensive and simple, for the remote benefit to be gained by the isolation of consumptives is only problematical along the line of economy or in saving life. Yet if we allow ourselves to theorize, it seems that eventually we could reduce these cases to the minimum, remove from our hospitals foci of infection to other cases, and perhaps bring about some real reform in the care of seamen afloat.

WILL THE SAILOR GO TO A SANITARIUM?

Now we shall have to consider the question from the sailor's standpoint. Will he go to such a place after it is built for him? If he refuses to go there, what are we to do about it? Does the Government save money by his refusing to go, and if so, why? If he does go, will he stay and will he not return to sailing sooner or later and again become a charge? Will he not often use his transportation and never report for treatment? Will the negro go?

Probably not more than half of our cases will go in the early stages when there is a chance to cure them. The average sailor can not be made to see the gravity and importance of the disease at first, and he will put off and procrastinate until he is in the last stage; but that, however, is no more than he does to us at the station, and if he is sent away even in the chronic stage, he ceases to be a source of infection to others and the cost of maintenance is lowered. If he refuses to accept the conditions offered, which, of course, are the best, then we have the solution in a desirable manner, and that is to refuse absolutely to treat any case of tubercle of the lungs in hospital. We certainly can find many good reasons for this course of procedure, and as they will readily suggest themselves to our minds, it is unnecessary to tabulate them. That it would be right to act in such a manner and refuse them hospital treatment can not be questioned.

That we dispose of the consumptive and clear out our hospitals in this way, with a great saving of money, can be readily seen. I believe that most of the patients will remain under treatment at the sanitarium until discharged. But if the patient leaves without permission, he is effectually debarred from hospital treatment, and as he disobeyed orders, he can not be returned to the sanitarium. That many of the patients will use their transportation with never an intention to report at the sanitarium for treatment, I do not doubt; but even then money has been saved, for his transportation has not cost more than would his subsistence in hospital. The negro would never go to such a place away from his friends and relations. He would look upon such a place with suspicion, as all his superstition would be aroused, and the fear that he would die and serve a necropsy would be more than he could endure. However, that is only an incident in the peculiar nature of the negro race, and does not in any way deserve consideration. Even in our hospitals the negro leaves, if he can, so soon as he becomes hopelessly sick. This is solely to avoid necropsies; nothing else.

If we had such sanitariums, the Navy and Revenue-Cutter services would probably take advantage of it for their officers and men, many of whom contract the disease annually.

CONCLUSIONS.

The mortality of the consumptive sailor as shown by the annual reports is 21.4 per cent. The actual mortality if it were possible to

obtain correct data would probably be 40 per cent. The eventual mortality is probably 100 per cent.

The results obtained to-day are no better than were obtained twenty years ago, if we are to rely on statistics, i. e., relative mortality 1873 to 1877, 21.5 per cent; relative mortality now, 1890 to 1895, 23 per cent.

The results obtained to-day are not better than were obtained ten years ago, i. e., mortality from 1880 to 1885, 22.9 per cent; now, 23 per cent.

The improvements made in our hospitals have not lowered the mortality. The present methods of treatment have not lowered the mortality, but probably have attenuated the cases. There are probably more cases now than ten years ago. Our hospitals are foci of infection, dangerous to officers, attendants, and patients suffering from other diseases. Granting the most liberal allowance for faulty conclusions from the data at hand, it is quite probable that the Government can build sanitariums for these men, transport them to these places, and take care of them to a termination of the illness, for the amount that would be expended in their care at hospitals. All consumptives will do better with considerable altitude and dryness. The sanitarium is the ideal method of administration for these cases. At the sanitarium these cases can be closely studied, and all kinds of treatment tried. Taking that, then, to be a fact, the eventual outcome would, from a medical standpoint, be an ideal one.

FEMORAL HERNIA—BASSINI'S OPERATION—RECOVERY.

By P. A. Surg. J. B. STONER.

J. C. (white); aged 30 years: nativity, New York; admitted to the United States Marine Hospital, Chicago, Ill., January 29, 1898, for operation for radical cure of hernia. He was previously in this hospital for a protracted diarrhœa from December 7, 1897, to January 28, 1898. Has a femoral hernia, right side, size of a goose egg, irreducible. Says it was sustained twelve years ago in a jumping contest; that it has gradually enlarged to its present dimensions, and is now accompanied by paroxysms of pain which is increased at work; has never worn a truss. Operation under chloroform anæsthesia. Usual antiseptic precautions. Incision made parallel with Poupart's ligament (Bassini) over the fundus of tumor, and the tissues carefully divided down to the sac. The sac was then opened and a finger introduced to the edge of constriction (Gimbernat's ligament) when a hernia knife was passed along the finger and the constricting fibers nicked. A portion of adherent omentum was tied off and removed and the hernia reduced. The sac was found to be closely adherent, and in freeing it for high ligation it was accidentally excised before a ligature could be applied. Silk sutures were then inserted by a curved needle, so as to unite Poupart's ligament with the pectineal fascia, the first being placed near the spine of the pubes, the second half a centimeter externally, and the third about a centimeter from the femoral vein. These sutures were left untied until two others had been passed—first through the edge of the falciform fascia, then the pectineal fascia, the lower suture entering just above the saphenous vein. The upper and lower sutures were then tied and the skin incision closed without drainage.

February 17.—Examination shows union by first intention. Stitches removed and dressings reapplied.

February 25.—No impulse on coughing. Result satisfactory. Temperature never rose above a fraction of a degree, except one day, when it was 38° C.

NOTE.—This patient has been heard from some seven months after the operation, and the result has so far been satisfactory in every respect, although the man has been engaged in hard work since the date of his leaving the hospital.

CASES FROM HOSPITAL PRACTICE, UNITED STATES MARINE HOSPITAL, MEMPHIS, TENN.

By P. A. Surg. G. B. YOUNG.

INCISED WOUNDS OF ARM AND BACK.

W. C., a very muscular negro of 26, was admitted to hospital suffering with wounds inflicted with a long-bladed, very sharp pocketknife. The wounds had been received two days previous and, except for the application of a little arnica and a rough dressing, had been unattended to. There were two wounds in the back, one a trifling cut an inch or so in length, the other was about 4 inches in length, and extended diagonally downward and outward from just over the spinal process of the eleventh dorsal vertebra—it divided skin, fascia, and subcutaneous tissue, and the skin had retracted until a flat raw surface 2 inches wide presented. The remaining wound began at the right acromio-clavicular articulation, and extended, deepening as it went, first downward and backward, then downward and forward, beyond the posterior axillary fold. This wound divided everything down to the bone; it was difficult to believe, as was the case however, that one stroke with a pocket-knife could inflict such an injury. The outer fibers of the deltoid, the upper portion of the brachialis anticus, and the long head of the triceps were cleanly divided, the latter being severed just where the belly contracts to form the long head. Two days having elapsed, the divided muscles had retracted widely, and a hole as large as one's fist led up into the axilla, uncovering the axillary vessels and nerves. The wounds of the back presented nothing of interest—were closed with catgut sutures and healed promptly. The shoulder wound presented a more troublesome problem; the wide retraction of the divided muscles and the time that had elapsed since the receipt of the injury made it doubtful if union with restoration of function could be obtained. Under ether the wound was carefully cleaned with H_2O_2 , followed by hot water, edges and commencing sloughs trimmed off, and the ends of the divided muscles approximated with closely set tiers of catgut sutures. The superficial wound was then closed with intercepted gut sutures. A catgut drain was introduced in the lower angle of the skin wound and a splint applied, so as to fix the deltoid as much as possible and at the same time maintain the extension of the forearm and consequent relaxation of the triceps. His temperature rose once to 38.2° C. and remained normal thereafter, and he made an uninterrupted recovery, being discharged in twenty days with complete restoration of function. This case is reported, not from any unique interest attached to the injury or treatment, but because it offers a striking illustration of the reparative faculty possessed by the tissues of a vigorous man, and the result should encourage us to attempt the primary repair of divided

muscles and tendons, even although several days have elapsed since the receipt of the injury.

COMPOUND COMMINUTED FRACTURE OF THE SKULL WITH LOSS OF
BRAIN SUBSTANCE—RECOVERY.

N. R., an unusually muscular and powerfully built negro of 23, was admitted to hospital with a history of having been struck on the head with a stone twenty-four hours previously. His friends stated that they had wiped oozing brains from his face soon after the receipt of the injury. Patient had been seen by a physician immediately after receipt of the injury and one or two sutures taken in his wound, but no attempt made to cleanse the wound or vicinity. Examination showed a wound on the left side of the cranium a little below and behind the frontal eminence. The wound was about 2 inches long. One end had been partially closed by silk sutures, but the lips gaped widely and the wound and vicinity were caked with clotted blood and discolored with the clay dust peculiar to the soil of the neighborhood, the patient having fallen in the mud on receipt of the injury. A tear was plainly visible in the membranes, and through it a small amount of cerebral substance was partially extruded. Patient quite rational, but with no memory of the circumstances attending the receipt of his wounds. Temperature, 38.6°; pulse, 80, and of good force and rhythm; bowels had moved naturally; pupils normal; no paralysis or disturbance of sensation.

Patient etherized and placed in semirecumbent position. The frontal bone was found to be comminuted over an area of $3\frac{1}{2}$ by $2\frac{1}{2}$ inches. (Patient had an unusually large head and a peculiarly domed-shaped frontal bone.) The upper inner angle of the fractured area A was 1 inch from median line and $3\frac{3}{4}$ inches above margin of orbit. From this point the line of fracture extended forward $2\frac{1}{2}$ inches to B, then upward and outward for an inch to C; thence downward and outward $1\frac{1}{2}$ inches to the fronto-parietal suture at D. Commencing at A again, a fracture extended outward and downward for 1 inch to E, and then backward and downward to fronto-parietal suture. Along suture from D to F the bone was unfractured. The wound was freely enlarged by a cruciform incision, and it was found that over the area A B C E the bone was comminuted to a large number of fragments, most of which had been driven into the brain through a tear in the dura at B, while along the line of suture at A E a strip of bone three-fourths of an inch wide was bent down at right angles to surface of brain and pressed firmly upon but had not penetrated the dura. The tongue of bone C F D E was depressed to the depth of one-fourth inch and its point caught under the edge of the above-described strip. Just at this point there was a large tear in the dura and a cavity in the brain about the size of an English walnut. This cavity contained several pieces of bone. All the rough edges were smoothed with rongeur forceps and the fragments carefully removed from the brain. The tongue of bone C E F D

was freed from under the margin of the depressed strip A E by cutting away a portion of the latter, and then, but with considerable difficulty, elevated into place. Once back into place, however, it fitted snugly and retained its position. The finger was then introduced under the strip A E as far back as the suture, and it was found that there had been a bending along the line of suture; the undersurface of suture was unfractured and smooth. The cavity in the brain was freely injected with H_2O_2 , and a large splinter of bone, which must have been very deeply embedded, since the finger had failed to find it, brought to light. There was a very troublesome hemorrhage from the edges of the bone and scalp (the latter being of even more than the usual African thickness), but it was finally controlled by a saturated alcoholic solution of antipyrine. The wound was carefully dried and the entire wound, including the cavity in the brain, was filled with glutol, the incision over sound bone united by two tiers of sutures, one buried and the other superficial, the rest of the wound left open and a dry-gauze dressing applied. Patient put to bed and ordered fluid diet and divided doses of calomel.

19th.—Pulse, 65; temperature, 37.2° . Is a little stupid, but otherwise apparently none the worse for his experience.

20th.—Temperature rose to 38° last night, but is normal this morning. The dressing having become stained and having been partially disarranged by the patient, it was removed and the wound found perfectly clean. Redusted with glutol and dressed as before. Patient very unwilling to stay in bed and objects strenuously to so much trouble “*erbout a little knock on de haid.*”

21st.—Last night he escaped from the hospital in his shirt and ran about a half a mile to the house of his “woman.” Was recaptured and placed in restraint straps, and seems none the worse for his adventure. Temperature, 37.4° ; pulse, good. Is clamorous for more food, especially for cabbage.

23d.—Is brighter, but still insists on leaving hospital to see his inamorata. It would appear that the control of his reasoning centers over his purely animal instincts, weak enough at best, is entirely destroyed.

24th.—Last night he freed himself from his restraint straps, ran half a mile, hotly pursued by the night nurse, climbed in a window at his mother's house, secured a pair of trousers, and went a half mile farther in search of his ladylove. Was recaptured and brought to hospital. This morning his temperature is 37.3° ; the dressing is disarranged and dirty. On removal of dressing there was found to be considerable serous oozing; this with the glutol had made a dirty looking, pasty mixture. This was all carefully removed and the wound surfaces beneath found perfectly clean and sweet. Refilled with glutol and dressed. His discovering last night that his ladylove had deserted him has crushed his spirit utterly, and he now consents to stay in the hospital.

25th.—Temperature continues normal and he is much brighter.

28th.—Dressed. At the angle over the wound in dura the wound has firmly united, but over the exposed bone there is still an unhealed area about the size of a quarter, caused by the retraction of the flaps. The glutol seems to have become exhausted, and at the lower angle of the wound has formed with the wound secretion a small accumulation of semifluid, yellowish mixture. On wiping this away the surface below was found perfectly clean, but there are some clumps of exuberant granulations. These were freely touched with AgNO_3 . The wound and vicinity was then freely flushed with H_2O_2 , and dried and refilled with glutol. He now appears to be in perfectly normal health, both mental and physical.

30th.—Deserted.

He returned several days later to have his wound dressed, when it



was found to have partially healed throughout—a small, superficial gap about one-half inch long alone remained.

I have dwelt in detail on the conditions found at each dressing, because the substance used in the wound, glutol, was new to me and to the profession generally, and the proper method of use and the explanation of the appearances presented had to be arrived at experimentally. It would seem that the glutol became exhausted in about forty-eight to seventy-two hours and then needed to be renewed. Considering the disarranging of the dressings and the other features of the history, I think the effect of the glutol in preserving the wound from infection is satisfactory, not to say remarkable, in the highest degree. I have seen the patient recently, ten months or more since the receipt of the injury, and he is as well as ever he was.

UNUNITED FRACTURE OF FEMUR—OPERATION—RECOVERY.

Six months previous to admission to hospital patient sustained a fracture of the right femur at a point a little above the junction of the middle and upper thirds and a fracture of the right tibia at about its middle. He states that his leg was put up first in a long, straight splint, but without any improvement resulting. Subsequently was put up in plaster, but the splint extended only an inch or two above the site of the upper fracture and was so loose that he could turn his leg in it. This remained on for over two months and on removal the fracture was still ununited.

Condition on admission: A man of large frame but very emaciated, anæmic, and in very poor general condition. The upper fragment of femur is cocked upward and outwards. The end seems very close to surface and feels rough. The lower fragment drawn upward. There is partial union, apparently ligamentous, between the end of the lower and side of the upper fragment, in such a way that while he can move the limb slightly as a whole, the end of the upper fragment moves quite freely in response to the pull of the outward rotators. There is pain on motion, and great pain if he attempts to put any weight on the leg. The shortening is a little over 4 inches. The fracture of the tibia is fairly well united by ligamentous union, but some motion is present and pressure is very painful. The patient's general condition precluded operative interference, so he was placed on extra diet, tonics, etc. He was then given a thorough course of antisypilitic treatment and then put into a Buck's extension apparatus, combined with massage about the site of fracture. He stood the confinement so badly that at the end of two weeks a Bavarian splint was applied, exercise on crutches permitted by day, and the extension apparatus reapplied at night. A severe attack of dengue depressed him so much that all restraint had to be discontinued and a course of tonics, etc., prescribed. His general condition, weight, etc., rapidly improved. December 26 he was etherized and a long incision made down outer side of thigh, with its center opposite the end of the upper fragment. It was my intention to divide the ligamentous union, chisel away callous, and unite the ends of fragments by a Senn's bone ferrule. I found, however, that the end of the upper fragment had developed a round, knob-like extremity, and that the end of the lower fragment was embedded in a mass of semideveloped callous. While attempting to chisel this away carefully a sharp crack was heard and the upper fragment was found to have fractured higher up—the line of fracture running from the site of the original fracture up the center of the shaft for 3 inches and then obliquely upward and outward to a point just at the base of the great trochanter. Subsequent examination showed that the fragment was of a very porous bone—had in fact been the site of a rarefying osteitis. I removed this fragment and then divided a ligamentous band which was found to unite the end of the lower fragment to the inner side of the upper frag-

ment at the base of the lesser trochanter, pulled the limb down until the end of the lower fragment was in proper relation to what remained of the upper fragment, washed out with H_2O_2 , closed wound with deep and superficial catgut sutures, and applied a long, fenestrated wire splint, under which extension straps extended to above the knee. A moderate weight was applied and the foot of the bed elevated. The fragment removed measured 4 inches in length and embraced fully half the circumference of shaft.

The accompanying Figure I shows the line of original fracture at the black line and the line of fracture during operation at the dotted line. The upper end of the lower fragment was united to the shaft at A.

Figure II shows the position of the fragments before operation.

Figure III shows the position at the end of operation and the gap left by the removal of the fragment.

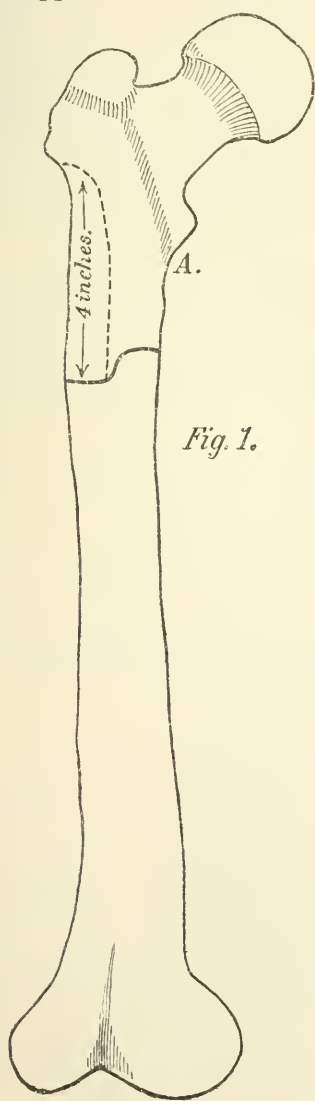


Fig. 1.

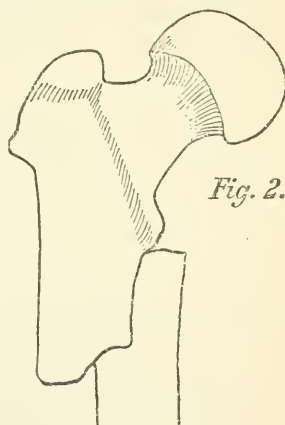


Fig. 2.

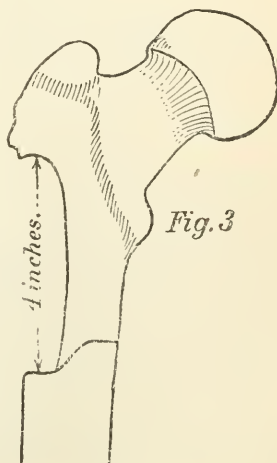


Fig. 3

His temperature did not go above 37.5°. Dressing removed on the fifth day and wound found to be closed throughout by primary union. Adhesive plaster strips were applied around limb, over a gauze pad, in order to relieve tension on the freshly united surfaces. He stood confinement badly, and at the end of fourth week began to cough; examination showed a few râles at apices, and a little later tubercle bacilli were found in his sputum. The splint was at once replaced by one of plaster of paris, and the patient encouraged to get about on crutches. Under ascending doses of creosote he rapidly improved. Eight weeks after operation the splint was discontinued, but extension applied at night while the limb was steadied with sand bags. The fracture of the tibia was found firmly united, and an enormous callous, feeling as large as a small cocoanut, had developed about the site of the fracture in femur. This rapidly diminished in size. The alignment of fragments was apparently accurate and the union perfect. There was, however, complete ankylosis of the knee. Careful measurement showed the limb to be 2 $\frac{7}{8}$ inches shorter than its fellow, a gain of 1 $\frac{1}{2}$ inches by the operation. He was given a high-soled shoe and crutches, but soon discarded crutches for a stick.

He went out on pass, got drunk, and wanted to kill the night nurse, so was discharged. At this time (four months after operation) his lung seemed about well, and he walked fairly well with a stick and a 2 $\frac{3}{4}$ -inch sole on the shoe for the foot of the injured leg. The knee was still partially ankylosed. This rapidly improved, and he resumed his occupation as deck hand on an ocean-going steamship, being able to get about perfectly in all kinds of weather.

The infection with tuberculosis doubtless came from a patient in the next bed, who was suffering with that disease, there being no facilities for isolating cases of tuberculosis. At any rate, he did not have it on being put to bed after operation, and developed it in four weeks after being exposed to a very probable source of infection. The very large piece of bone removed and the extensive opening of the medullary canal, together with the subsequent complications, seem to render the case sufficiently unusual to warrant the report in detail.

SYPHILITIC PARALYSIS FOLLOWING URETHRAL CHANCRE.

I. H. (colored); aged 23 years. Five years ago he had a purulent discharge from his urethra. The onset was sudden, the period since intercourse uncertain, the discharge thick and creamy. Did not have marked pain or burning on urination. Had a swelling in one groin at the same time. The discharge ceased without any treatment in about two weeks and swelling in groin also disappeared. Has never had any sore throat or any eruption on body. Careful examination of genitals fails to show signs of scars anywhere. Skin over body and limbs smooth and without scar or discoloration. Has chain of enlarged glands in either groin and also enlarged post-cervical and epitrochlear glands.

Ten days ago was taken with pain in left shoulder, extending down side of chest. Pain not very severe, but lancinating in character. During that night pain became more severe and side and shoulder felt numb. He soon began to feel numbness all over—face, lips, tongue, trunk, and limbs. This was on the second day of attack, and on that night he had severe pain just under tip of xiphoid cartilage. During the afternoon of that day his legs and feet began to swell. Since the date of onset has gotten steadily worse. At present he walks with a moderate amount of ataxia, reels slightly when eyes closed, knee jerk entirely absent. More or less complete anesthesia and analgesia over entire cutaneous surface; also over lips and tongue. No involvement of the ninth pair, but marked involvement of fifth and tenth. The diagnosis was made of a multiple neuritis, of syphilitic origin, following urethral chancre. Patient put upon mercury and ascending doses of potassium iodide. Began at once to improve. At the end of six weeks he left the hospital nearly well. I saw him at intervals thereafter and he had entirely recovered.

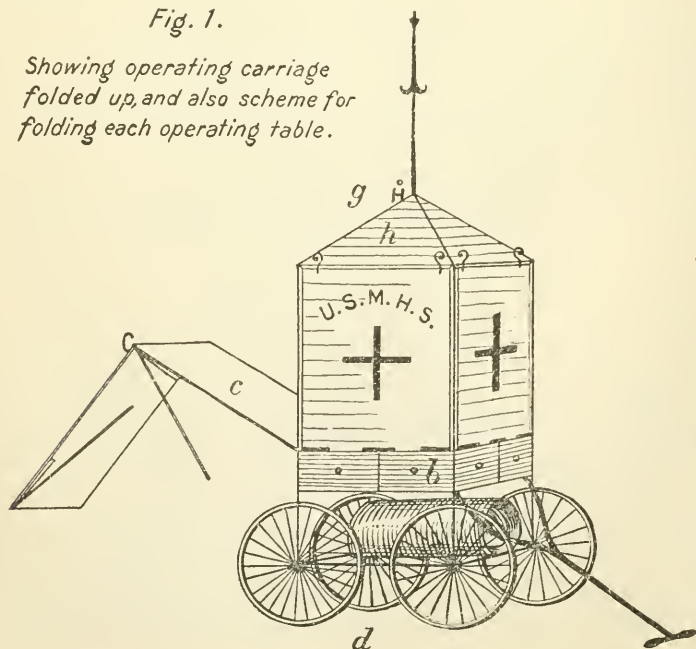
A PORTABLE OPERATING ROOM.

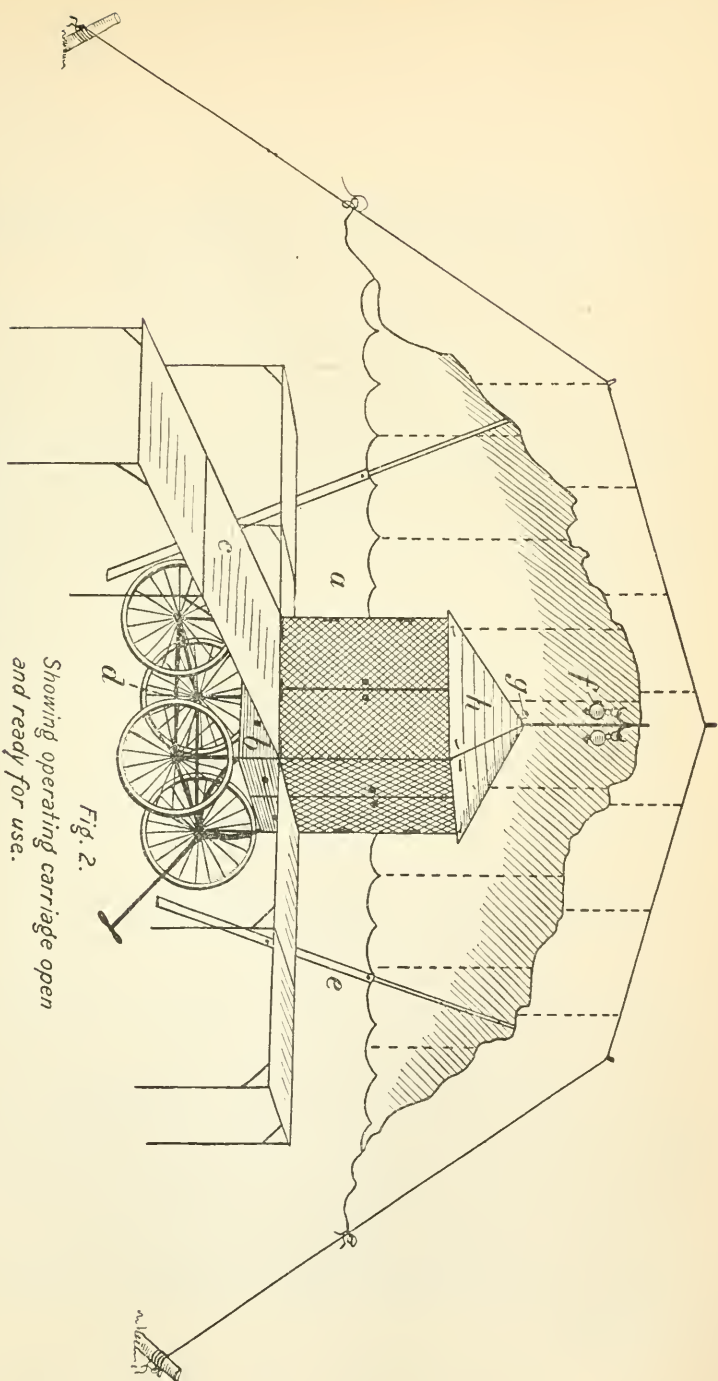
By Assist. Surg. L. E. COFER.

The portable operating room, sketches of which are seen below, is intended for use in caring for the wounded after a battle or after a skirmish on marches either with army or naval landing forces. It may be dragged either behind an ambulance or by members of the hospital corps. In action, it should be unfolded in a protected place near by, and the canvas spread to protect the patients from the elements. In the cage in the center should be kept artery forceps, tourniquets, gauze, sponges, bandages, ether, and such other necessary supplies as will insure the greatest facility in giving first aid to the injured. The cross arrangement of the tables not only admits of four patients being operated on at once, but they can be cared for all night in these improvised hospitals. For lightness and durability, I would suggest that the material used be white enameled sheet iron, with steel frame and strong bicycle wheels. Not being a mechanic, I must leave the details to the instrument maker. The tent sections, steel extension tent rods, guy ropes, pegs, and lanterns may be packed underneath the cage between the wheels.

Fig. 1.

Showing operating carriage
folded up, and also scheme for
folding each operating table.





*Fig. 2.
Showing operating carriage open
and ready for use.*

- a. Cage for surgical instruments and supplies.
- b. Drawers lined with zinc for instrument trays, etc.
- c. Showing three of the four folding operating tables.
- d. Indicating space for packing tent sections, extension tent rods, etc.
- e. Extension tent rods.
- f. Lamps.
- g. Water-tight cap to sterilized water tank, the spigot opening into the cage (a).
- h. Water tank.

SEVERE LACERATED WOUND OF THE FOOT INVOLVING THE
BONES OF THE METATARSO-PHALANGEAL JUNCTION, AND THE
MUSCLES NEARLY TO THE PLANTAR SURFACE.

By Asst. Surg. J. H. OAKLEY.

Seaman C. O. F.: aged 33; nativity, Norway; admitted to the United States Marine Hospital, port of San Francisco, Cal. Four days previous to admission, while busy oiling the engine, he got his left foot caught between the crank and the bed frame of the engine. The crank crushed its way through the dorsal surface of his foot just on a line with the metatarso-phalangeal articulations, leaving the toes hanging by some of the plantar muscles and skin. The little toe was entirely severed. The captain of the vessel tied a few arteries and replaced the toes, putting in several cutaneous stitches on the dorsal surface of the foot to hold them in place. An examination disclosed a jagged wound extending from the internal surface of the ball of the great toe, across the dorsum of the foot to its outer side. Pus was escaping from the wound at a number of places. The extremity of the fifth metatarsal bone was exposed. The fourth toe was hanging by skin and a few shreds of muscle only. It was decided to remove the fourth toe and to make an effort to save the three remaining toes, as they appeared to be well supplied with blood, and were of good temperature. On the 18th of October he was placed under an anesthetic (chloroform), the stitches removed, and the toes allowed to fall back. The exposed extremity of the fifth metatarsal bone was removed, and the fourth toe amputated. The wound was found to be full of sloughing tissue and numerous fragments of bone. With bone-cutting forceps the exposed ends of the bones (metatarsal and phalangeal) were removed. The tissues were thoroughly curetted, all the loose pieces of bone removed, the arteries ligated, and the toes brought up in position and held there by numerous deep sutures. The stitches were removed November 3, 1896. The inner and outer thirds of the wound healed promptly; the middle third was slow in closing in, as it filled up from the bottom by granulations. Barring the loss of the two toes, the man's foot is about as good as it ever was. He flexes his toes fairly well, and has good locomotion. The case is submitted as a creditable example of conservative surgery.

TOXIC AMAUROSIS—RECOVERY.

By Asst. Surg. J. B. GREENE.

Seaman J. H.; aged 34; nativity, Connecticut; admitted to United States Marine Hospital, Baltimore, Md. Patient comes to hospital for "blindness." Parents are living and healthy.

Patient had measles when 8 years of age. No other serious illness. Denies syphilis, and there is no evidence of previous infection. Has used tobacco freely. For some days previous to illness had been drinking daily about 240 c. c. of jamaica ginger with some whisky. Two days before admission to hospital patient felt dizzy and nauseated. About the same time everything began to appear dark, and day seemed like night.

On admission to hospital patient could not see a lighted candle before his eyes. Pupils were widely dilated. Complained of some tenderness on palpating his eyes. Ophthalmoscopic examination revealed slight congestion of the veins of the retina. The urine showed no pathological changes.

Treatment was begun with a saline cathartic followed by iodide of potash and strychnia in appropriate doses.

January 4.—Patient begins to distinguish objects. Can count fingers 6 inches from eyes.

January 5.—Complains of pain in eyes, and headache.

January 6.—Is able to go about in ward. Pupils less dilated, though still complains of pain in eyes.

January 8.—Improvement is not so rapid as at first.

January 13.—Still improving. Says he can see best out of the corner of his eyes.

January 22.—Can now recognize faces across the room. There is no evidence of color blindness.

February 8.—Patient can now see to read, but only for a short time. Is discharged to-day.

HERNIOTOMIES.

By Asst. Surg. H. S. MATHEWSON.

Of the eight cases operated upon for the radical cure of inguinal hernia during the last half of the fiscal year of 1896, at the United States Marine Hospital in San Francisco, four present features of perhaps more than passing interest.

The cases in detail are as follows:

Case 1.—J. T.; aged 45; native of England. History of hernia of six months' standing. Physical examination: There is a right direct inguinal hernia easily reducible, and when down presenting in the region of the external inguinal ring a protrusion about 6 cm. in length and 2 cm. in diameter. Operation February 3, 1897. Bassini done. The sac was reduced, but not tied off, and excised. The lower two-thirds of the posterior wall of the inguinal canal was deficient, and the opening was closed with five sutures of kangaroo tendon. The fascia of the external oblique was closed with catgut, and the skin with silkworm gut. Convalescence uninterrupted until the sixteenth day after the operation, when deep-seated tenderness and pain beneath the upper end of the incision revealed the presence of a small abscess. This was incised and drained. It closed by granulations in ten days. The situation of the abscess at the site of the deep sutures, and its slow development, would seem to show that the kangaroo tendon used was not sterile, but was infected with that slow-growing pyogenic coccus described by Ferguson and Biggs as often present in the "sterile" kangaroo tendon supplied by the trade.

Case 2.—F. E.; aged 27; native of Greece. History of an acute right-sided orchitis of four days' standing, said to have been caused by the reduction of an incarcerated right inguinal hernia. This condition was treated without improvement for two weeks, when a diagnosis of tubercle of the testicle was made, and castration, together with an operation for the cure of the hernia, was advised. Physical examination: The right testicle is twice its normal size, and is intensely painful upon manipulation. Adhesions are present at the outer and lower part of the scrotum, between the parietal and visceral layers of the tunica vaginalis testis, and at one point there is softening, evidently due to the breaking down of the tubercle deposit. There is a right oblique reducible inguinal hernia, the mass presenting in the upper part of the scrotum being 7 cm. in length and 3 cm. in diameter. Operation February 14, 1897, at 11 a. m. Ordinary Bassini incisions made, and through this the testicle, tunica vaginalis testis, hernial sac and cord were delivered. The cord

and sac were tied off separately, well within the internal inguinal ring, and the stump allowed to retract within the abdominal cavity. The abnormally large internal ring was entirely closed by deep sutures of kangaroo tendon, and the rest of the wound, except at its lower angle, closed as usual. An unusual amount of hemorrhage was noticed during the operation and the scrotal cavity was packed with iodoform gauze to control it, the ends of the gauze being brought out through the lower end of the wound. A dry dressing with firm pressure was applied. At 6 p. m. on the day of the operation the dressings were soaked with blood. Upon their removal a general oozing from the entire incision was noticed. Upon the day following the operation the scrotum was found to be widely distended with blood. The gauze packing was removed, the clotted blood washed out by hot irrigations, and the hemorrhage apparently checked. Upon the day following the hemorrhage recurred, and the lower part of the wound was opened up and the entire wound was firmly packed with iodoform gauze. Despite vigorous treatment the hemorrhage continued for ten days, gradually becoming more serous in character, until it finally ceased. No bleeding point was found at any time, the hemorrhage consisting of a general oozing from the entire raw surface. Pus was never present, and the wound closed kindly by granulations on the twenty-second day after the operation, with no tendency to a recurrence of the hernia. No history of an abnormal amount of hemorrhage, following slight wounds, could be obtained from this patient, but one is constrained to believe that there was present a moderate degree of the condition known as hæmophilia.

Case 3.—H. G.; aged 27; native of England. History, very indefinite in character, of a hernia of several months' standing. Physical examination: There is a left reducible inguinal hernia descending to the bottom of the scrotum, the presenting mass being about 7 cm. in diameter. Operation March 7, 1897. Bassini, atypical in character, done, as the hernia was found to be congenital, and associated with an undescended atrophied testicle, fused to the side of the hernial sac, and situated at the upper part of the scrotum. A large mass of hypertrophied omentum was tied off with a chain ligature of catgut, and the stump reduced. The hernial sac and cord were tied off at the level of the internal ring and the sac, cord and testicle excised. The internal ring was completely closed and the external wound closed in the usual manner. Upon the third day after the operation symptoms of general peritonitis developed, and the patient died on the fifth day, his condition at no time admitting of operative interference. There was no infection of the wound. Upon autopsy the omental stump was found to have retracted, and to occupy a position just beneath the free border of the left lobe of the liver. About the stump the degree of peritoneal inflammation was most marked, and the infection was apparently traceable either to the catgut used as ligature, or to infection of the

omental stump during the manipulation incident to the application of the ligature.

Case 4.—O. A. P.; aged 40; native of Sweden. History of a hernia of a year's standing. Physical examination: There is a left reducible inguinal hernia, descending to the upper part of the scrotum, the presenting mass being 7 cm. in length and 3 cm. in diameter. Operation April 8, 1897. Ordinary Bassini done. Convalescence was uninterrupted until the thirteenth day after the operation, when the patient had a rise of temperature to 39.2. Upon the fourteenth day the upper part of the wound reopened and considerable clotted blood escaped. Symptoms of enteric fever developed, and for the next three weeks the temperature curve and general condition of the patient was typical of that disease. At no time was there any infection of the wound. It showed no tendency to close until the subsidence of the fever, at which time granulation began to develop, the wound closing eight days after the temperature curve reached the normal.

The conclusions to be drawn from these cases are: That resterilization of all "sterile" suture and ligature material furnished by the trade is absolutely necessary; that hamophilia is a possible complication in every surgical case; and that the supervention of enteric fever arrests the healing process in a wound.

THE RADICAL CURE OF HERNIA, WITH REPORT OF CASES.

By Acting Asst. Surg. J. B. EAGLESON.

During recent years the improvement in the technique and the degree of safety insured by carefully followed aseptic methods makes the results achieved in the radical cure of hernia so favorable that nearly all of the foremost surgeons of the day advocate the operation in all favorable cases. Some operators are so sanguine that they advise operating in all cases, regardless of a patient's occupation or condition in life. This is no doubt going to the extreme. However, in certain classes of men, such as sailors, mining prospectors, and others who are exposed to the constant dangers of an accidental incarceration or strangulation while in some out-of-the-way place where surgical relief can not be secured, I would advise an operation whenever there is a possible chance for a successful result.

It is not my purpose at this time to enter into a discussion of the many and varied operations for the cure of hernia, but will simply give a short description of the two newer operations used in the cases given in the accompanying report. The McBurney, Bassini, and Halstead operations are familiar to all.

With the exception of the removal of a portion of the veins accompanying the cord, which did not seem to me to be necessary, the operation as described by Dr. Halstead is followed in the "combined method" until the introduction of the sutures to close the old canal and to form the new abdominal ring. The suture as introduced forms a combination of the mattress and Lembert sutures in the one suture.

The various steps of the operation are as follows: The patient having been thoroughly prepared for an aseptic operation, the incision is made in the skin from the spine of the pubes to a point about 5 cm. above and external to the internal abdominal ring. The subcutaneous tissues are divided so as to expose the external ring. The aponeurosis of the external oblique muscle, the internal oblique and transversalis muscles and the transversalis fascia are cut through from the external abdominal ring to a point about 2 cm. above and external to the internal abdominal ring. The sac is carefully isolated and opened and its contents replaced, and then sutured with mattress or continuous sutures as high as possible above the neck. It is then cut away close to the sutures. The cord, which has been cleared of all fat and fascia, is held up out of the wound by a hook, while the sutures are inserted. These sutures are of kangaroo tendon prepared after the method of Dr. Marey, of Boston, and are inserted with a Peasle needle. The needle,

This gives the manner of introducing the combined mattress Lembert suture.

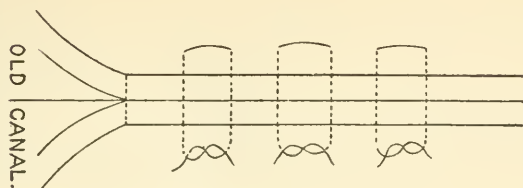


FIG. 3.

This shows the result produced when the mattress suture is drawn tight, causing an outward projection of the edge, forming a ridge.

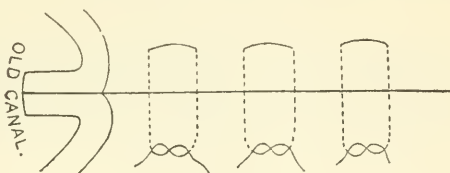


FIG. 4.

This shows the result produced by the combined suture, the edges forming a ridge projecting into the old canal.

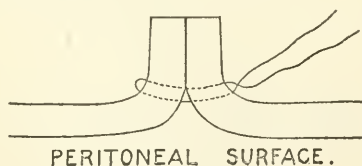


FIG. 5.

This shows the edges pouting out from use of the old suture.

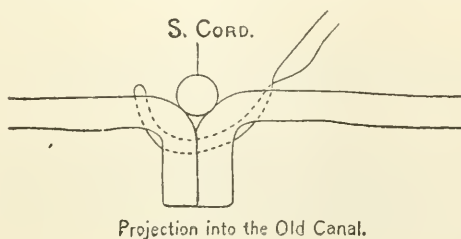


FIG. 6.

This shows the edges turned in by the combined suture and the cord lying in the groove thus formed, where it is covered by the skin.

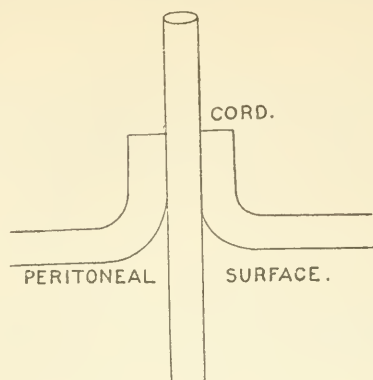


FIG. 7.

This shows the way the new ring formed by the mattress suture closes around the cord, leaving a crevice on both sides, which invite the intestine or omentum to gradually work its way through and form a new hernia.

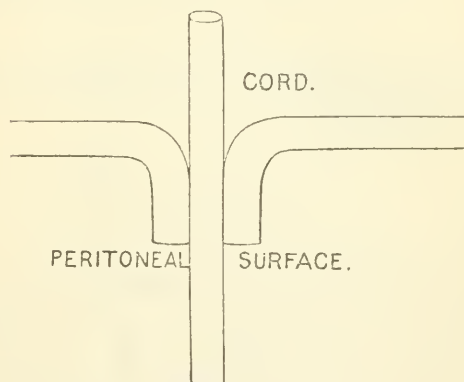


FIG. 8.

This shows the edges turned in around the cord by the combined suture, thus forming a projection to ward off the direct outward pressure of the intestines.

Care must be taken in introducing the two outermost sutures on either side of the cord. They must hug it closely, and yet not tightly enough to cause strangulation. The skin is now brought together by a continuous subcutaneous silkworm gut suture, which is withdrawn in about two weeks.

The weak point in the Halstead operation, and likewise in my combined method, is the new ring. The cord passes directly through the abdominal wall, instead of obliquely as nature originally gave it exit,

and consequently when the internal opening of the new ring gets slightly dilated there is no second covering to check its onward march. The recurring protrusion of the abdominal contents is practically a ventral hernia, similar to one following a cœliotomy. Since the new hernia is situated much higher up than the original oblique variety, it is much more difficult to retain by a truss.

I have for the above reasons abandoned both of these operations for the "imbrication or lap joint method," which was devised by Dr. E. Wyllys Andrews, of Chicago, which I believe to be the simplest and best operation for the radical cure of hernia which has so far been recorded.

The following is a brief outline of the operation: After making the usual skin incision and carefully checking all bleeding points, an incision parallel to Poupart's ligament, about 3 cm. above it, is carried from near the pubis to a point a little above the internal ring, through the tendon of the external oblique and parallel to its fibers. The lower end of this incision should terminate near the external ring, but it is not necessary to divide the ring itself. The sac having been dealt with as in the other operation, the canal is now cleared of all structures but the spermatic cord, which is gently lifted from its bed and held by a blunt hook or retractor while the deep sutures are being placed. The lower flap of the aponeurosis of the external oblique is now turned downward, while the upper flap is firmly stitched to Poupart's ligament, together with as much conjoined tendon and transversalis fascia as can be found, thus forming the posterior wall of the canal. The cord is now replaced and the lower flap of the aponeurosis is turned up over it and stitched above. This arrangement forms a lap joint and gives broad surfaces for union. It also gives three strong layers of aponeurosis in the place formerly occupied by two, two of the three being at the point of greatest strain, namely, behind the cord, and all shortened or narrowed by an amount equal to the extent of the overlapping. Either kangaroo tendon or chromicised catgut may be used for the deep sutures and a silkworm gut continuous buried suture for the skin.

The following operations for the radical cure of hernia have been performed at this station:

Case 1.—November 4, 1891. A. O. L.; aged 24 years; a native of the United States. Left oblique inguinal hernia. The gut had been strangulated for eighteen hours at the time of the operation; patient had suffered intense pain and vomited frequently. The neck of the sac was incised and the confined gut relieved and drawn out of the abdominal cavity for thorough examination. After waiting a few minutes to make sure that the circulation would return, the intestine was replaced in the abdominal cavity. The hernia was a congenital one and the testicle was undeveloped and adherent to the sac wall within the inguinal canal. The sac was dissected out, including the testicle, and the canal and ring were stitched up with catgut. The skin was also closed with

catgut. Patient was discharged from hospital December 14. Was last seen about six months after the operation, when the result was very satisfactory.

Case 2.—February 17, 1893. J. L.; aged 28 years; a native of Ireland. This was a case of right oblique inguinal hernia, congenital, very similar to case 1, and had been strangulated for twelve hours. After relieving and replacing the gut, the sac and testicle were dissected out and the canal sutured by the open method of McBurney. It healed very readily and left a good solid cicatrix. Patient was discharged March 24, and has not been heard from since.

Case 3.—May 5, 1893. J. L.; aged 30 years; a native of England. Right oblique inguinal hernia. The sac was dissected out and tied off at the internal ring by a double ligature of catgut, and the canal sutured with silkworm gut retained in position by lead buttons after the open method of McBurney. A firm scar resulted. Patient discharged on June 30.

Case 4.—October 12, 1893. P. W.; aged 29 years; a native of Ireland. Right oblique inguinal hernia. McBurney operation. Nothing unusual in the case. Patient was discharged December 11, 1893, and when last seen, about five months after, still had a firm scar retaining the intestines readily.

Case 5.—December 2, 1893. J. L.; aged 34 years; a native of Denmark. Right oblique inguinal hernia. Operation by the Halstead method. Used catgut for the deep mattress sutures, and interrupted silkworm gut sutures for the skin. Wound healed nicely. Patient discharged February 1, 1894. Has not been seen since.

Case 6.—August 16, 1894. P. A.; aged 44 years; a native of Denmark. Right oblique inguinal hernia. This was my first operation by the combined method of using the Lembert suture as a mattress suture in the Halstead operation, with the idea of turning the edges of the fascia, tendon, and muscle into the old canal, making a groove externally for the reception of the cord, and forming a new canal beneath the skin. Kangaroo tendons, prepared by Dr. Henry O. Marey, of Boston, were used for the combined sutures, and interrupted silkworm gut sutures for the skin.

Case 7.—September 10, 1894. Operation on same patient for oblique hernia on left side. In doing this operation my supply of kangaroo tendon ran out, and I had to use chromicised catgut for the lowest combination suture. This proved to be infected, and caused a little suppuration in the lower angle of the wound. The skin was opened and the offending stitch removed, after which it healed nicely. Discharged from the hospital October 14. This case was last seen two months ago. Right side was firm, but the scar on the left side had given way slightly, but not sufficient to necessitate the use of a truss.

Case 8.—December 2, 1894. J. J.; aged 45 years; a native of Denmark. Right oblique inguinal hernia, irreducible. In this case there

was a tumor the size of a hen's egg, which could not be reduced, and was found to be a large piece of omentum, which had become adherent to the sac. The canal and ring were closed by the combined mattress suture and the skin by a subcutaneous silkworm gut suture. Discharged from hospital January 8, 1895. Patient was last seen six months ago, and the result was excellent.

Case 9.—January 15, 1895. F. A.; aged 43 years; a native of Austria. Right oblique inguinal hernia. Large scrotal hernia. Was operated on by the combined mattress suture with kangaroo tendon and a silkworm gut suture in the skin. There was nothing unusual in the case and he was discharged on March 6. When seen six months ago the result was excellent.

Case 10.—February 2, 1895. R. F.; aged 28 years; a native of Ireland. Right oblique inguinal hernia. Was operated on by the combined mattress suture. The recovery was uncomplicated. Discharged April 2. He has not been under observation since.

Case 11.—March 4, 1895. C. W.; aged 45 years; a native of Norway. Right oblique inguinal hernia. Was operated on by the combined mattress suture; result excellent. Discharged April 12. Was last seen in September, 1895, when there was no tendency to recurrence.

Case 12.—May 27, 1895. E. T. P.; aged 42 years; a native of England. Ventral hernia 2 inches above umbilicus, which had resulted from heavy lifting several years before. The tumor was the size of a small hickory nut and could not be reduced. It was at times quite painful, especially after hard work or lifting. It was found to be a small knot of omentum which had been forced through the fascia between the recti muscles and had adhered to its sac. It was tied off with catgut and the fascia and muscles stitched together with kangaroo tendon. Was discharged July 25.

Case 13.—July 3, 1895. H. B. P.; aged 24 years; a native of the United States. Right oblique inguinal hernia. Was operated on by the combined mattress suture. Case was uneventful. Discharged July 29, 1895.

Case 14.—July 26, 1895. J. M.; aged 61 years; a native of Ireland. Right oblique inguinal hernia of long standing with very large ring. The combined method was used with kangaroo tendon. Discharged September 12. Has not been seen since leaving the hospital.

Case 15.—August 16, 1895. L. G.; aged 51 years; a native of Germany. Right oblique inguinal hernia of long standing. The combined mattress suture was used with excellent results. Discharged October 9.

Case 16.—September 24, 1895. C. J.; aged 30 years; a native of Norway. Left oblique inguinal hernia. Was operated on by the combined method. Discharged October 29. When seen nine months later there was no tendency of hernia to return.

Case 17.—November 13, 1895. J. S.; aged 52; a native of Finland.

Right femoral hernia of several years' standing. The sac was tied off high up by double catgut ligature and cut off close, and the ring closed by stitching the fascia to Poupart's ligament. It healed nicely. Patient was discharged January 11, 1896.

Case 18.—November 19, 1895. J. A.; aged 43 years; a native of Austria. Left oblique inguinal hernia. This case had been operated on two years before in San Francisco, but it had returned. It could not be ascertained what method had been used in the former operation, but the new hernia had formed through the scar. This made it quite difficult to dissect out the sac. The ring was closed by the combined mattress suture with kangaroo tendon. Was discharged from hospital December 15. He was last seen in August, 1896, and there was a very slight recurrence of the hernia through the upper part of the scar, but not sufficient to require the use of a truss.

Case 19.—December 12, 1895. T. B.; aged 29 years; a native of Ireland. Right oblique inguinal hernia. Was operated on by the combined mattress suture method. Discharged February 8, 1896. He has been at hard work firing on steamboats and stevedoring since that time and has not felt the slightest trouble and there is no tendency to recurrence.

Case 20.—December 18, 1895. H. J.; aged 34 years; a native of Sweden. Right oblique inguinal hernia. This case was operated on by the same method, but unfortunately a severe hemorrhage occurred into the wound, the distention of the clot causing the skin suture to give way. The clot was scooped out and the skin reunited by interrupted sutures of silkworm gut. The recovery was considerably delayed by this accident. Was discharged from hospital February 16, 1896. When seen in October the result was very satisfactory.

Case 21.—December 22, 1895. P. H.; aged 28 years; a native of Ireland. Right oblique inguinal hernia. Congenital, with testicle retained in canal. When the testicle was freed from the sac, it accidentally dropped back into the abdominal cavity, and could not be recovered. The canal and ring were completely closed by combined tendon sutures. Discharged February 11. When seen ten months after the result was excellent, and the testicle had given no trouble, although he had been at hard work for several months.

Case 22.—January 24, 1896. E. F. O.; aged 26 years; a native of Germany. Left oblique inguinal hernia. Combined kangaroo tendon suture used. Was discharged March 12. The patient played football in a league during the season, and has never felt the slightest pain or disturbance in the wound.

Case 23.—February 6, 1896. T. G.; aged 32 years; a native of Wales. Right oblique inguinal hernia. The combined method was used. Discharged March 31. Has not been seen since.

Case 24.—March 10, 1896. E. C.; aged 36 years; a native of the United States. Right oblique inguinal hernia. Operated on by the

combined mattress suture method. He had an uncomplicated recovery and was discharged May 8.

Case 25.—August 5, 1896. W. A. C.; aged 35 years; a native of Germany. Right oblique inguinal hernia. Operated on by the combined mattress suture method. Recovery uneventful. Discharged from hospital September 19.

Case 26.—October 10, 1896. E. S.; aged 40 years; a native of Ireland. Right oblique inguinal hernia. Technique, the combined mattress suture. A slight suppuration of one stitch delayed the union somewhat. He was discharged December 7.

Case 27.—November 18, 1896. G. M.; aged 18 years; a native of the United States. Right oblique inguinal hernia. Combined sutures of kangaroo tendon. Union by first intention. Discharged from hospital December 9. No tendency to recur.

Case 28.—January 20, 1897. J. A. S.; aged 63 years; a native of the United States. Left oblique inguinal hernia. Scrotal variety of eight years' standing. For seven months prior to the operation he was almost completely disabled from following his trade as a marine engineer. He was a very large, fleshy man, and exceedingly nervous, so that it was difficult to keep him quiet in bed. The stitch above the cord suppurated and gave away, thereby causing a return of the hernia high up on the outer side of the cord. A secondary operation to close this by freshening the muscular edges and inserting new sutures was advised, but he refused to submit. Discharged February 28. The hernia recurred in about two months, and since then has increased in size and is but poorly retained by a truss. It is in fact a very low ventral hernia.

Case 29.—January 25, 1897. C. O.; aged 27 years; a native of Norway. Left oblique inguinal hernia. Combined mattress suture. Was discharged from hospital March 6. When last seen cicatrix was very firm.

Case 30.—February 20, 1897. J. H. S.; aged 46 years; a native of the United States. Left oblique inguinal hernia. Was operated on by the combined mattress suture of kangaroo tendon. Discharged April 1. When last seen, four weeks ago, there was no tendency to return.

Case 31.—March 9, 1897. F. W.; aged 65 years; a native of Germany. Right oblique inguinal hernia of one year's standing. Operated on by the combined method. Primary union was delayed by suppuration. Healed readily when a few pieces of kangaroo suture had come away. Discharged May 8. He has been at work at his trade as sailor ever since, the scar remaining very firm and secure.

Case 32.—April 5, 1897. E. A.; aged 15 years; a native of the United States. Right oblique inguinal hernia of one year's standing. Was operated on by Andrew's lap-joint method, with continuous silkworm-gut sutures for the aponeurosis and tendon, the ends being brought out through the skin in order that they might be withdrawn after union had

taken place. Healed by first intention. When an attempt was made to draw out the silkworm-gut sutures they adhered so firmly that it had to be abandoned. They were drawn out as far as possible and clipped off so that the ends retracted under the skin, thus making a buried suture. Discharged April 25. Has not been seen since.

Case 33.—April 11, 1897. C. W.; aged 54 years; a native of Ireland. Left oblique inguinal hernia of eight years' standing. Large, scrotal variety, and was retained by a very crude homemade truss, consisting of a piece of wood about 3 inches in diameter tacked to a band. Was operated on by the Andrew's lap-joint method, with kangaroo tendon. Patient was quite large and fleshy, and union was delayed by a slight suppuration in the adipose tissue. Discharged May 8. He has been working steadily since that time, with no tendency to return.

Case 34.—April 12, 1897. C. B.; aged 54 years; a native of Sweden. Right oblique inguinal hernia of twenty-five years' standing. Was well retained by a truss and did not descend into the scrotum. Operated on by the lap-joint method, using kangaroo tendon for sutures. Union by first intention. Discharged May 2. When seen a few weeks ago showed no tendency to return.

Case 35.—May 17, 1897. J. A. S.; aged 36 years; a native of the United States. Left oblique inguinal hernia of thirteen years' standing. Was caused by a slip of the foot while walking. Operated on by the Andrew's lap-joint method. There was a thick layer of fat over the ring, and union was delayed by a slight suppuration. Was discharged from hospital June 26. No recurrence.

Case 36.—May 21, 1897. C. M.; aged 36; a native of the United States. Right oblique inguinal hernia, which was caused by a heavy lift about six months before. Was operated on by the lap-joint method, with chromicised catgut sutures. Primary union followed. He was discharged June 20. There has been no tendency to recurrence of the hernia.

Case 37.—June 28, 1897. J. S.; aged 26 years; a native of Portugal. Right oblique inguinal hernia of eighteen months' standing, caused by lifting a heavy sack of grain. Was operated on by the lap-joint method, with kangaroo tendon sutures. Union was delayed somewhat by suppuration around the skin stitches. Discharged from hospital August 7, and has not been seen since.

Case 38.—June 28, 1897. R. P.; aged 36 years; a native of the United States. Left oblique inguinal hernia. Scrotal variety of eighteen years' standing, which was caused by jumping. Operated on by the lap-joint method, with kangaroo tendon sutures. Union was delayed by a hemorrhage which occurred under the skin, necessitating removal of the superficial stitches in order to scoop out the clot. Was discharged July 30.

Case 39.—July 5, 1897. R. T.; aged 36 years; a native of Norway. Right oblique inguinal hernia of twenty years' standing, which was caused by hard coughing. It descended into the scrotum, and had been

irreducible for several years. There was a peculiar condition of the sac in this case. It had been split close to the internal ring, and a slender prolongation of omentum had projected through it for about two inches, which had become adherent outside of the sac. Was operated on by the lap-joint method with excellent results. Was discharged August 14. Has not been seen since.

Case 40.—July 13, 1897. V. R.; aged 32 years; a native of Finland. Left oblique inguinal hernia, scrotal, of ten years' standing. It was retained by a truss with great difficulty. Was operated on by the lap-joint method, using cable-twist silk for sutures. Unfortunately one of the deep sutures was drawn too tight and caused a sloughing of the aponeurotic layer inclosed within the grasp of the suture, thus necessitating its removal and delaying union for several weeks. Discharged September 11. The scar remained very firm when last seen.

Case 41.—September 15, 1897. A. S. L.; aged 49 years; a native of the United States. Right oblique inguinal hernia, scrotal, of seventeen years' standing. During the past few years it had become very painful, thus greatly interfering with his work as a marine engineer. Was operated on by the Andrew's lap-joint method, with kangaroo tendon sutures. Primary union. Was discharged October 5. Scar remains very firm and he is free from pain and discomfort.

Case 42.—September 20, 1897. C. F. J.; aged 36 years; a native of Norway. Left oblique inguinal hernia. Was operated on by the lap-joint method. Discharged October 20. Has not been seen since.

Case 43.—September 27, 1897. E. E.; aged 31 years; a native of England. Left oblique inguinal hernia of four months' standing. Was caused by jumping. Operated on by the lap-joint method, with kangaroo tendon sutures. Primary union. Discharged October 15, and has not been seen since.

Case 44.—September 27, 1897. J. D.; aged 45 years; a native of the United States. Right oblique inguinal hernia of three months' standing. Was caused by lighting heavily on his feet from a fall. Was operated on by the Andrew's lap-joint method, with kangaroo tendon sutures. Union by first intention. Discharged from hospital October 17. Patient has not been under observation since.

Case 45.—December 21, 1897. M. H.; aged 33 years; a native of Norway. Right oblique inguinal hernia, which had been caused by a fall six months before. Was operated on by the lap-joint method, with kangaroo tendon sutures. There was a slight suppuration in the wound. Was discharged January 28, 1898.

Case 46.—February 5, 1898. J. L.; aged 37 years; a native of the United States. Right oblique inguinal hernia, which occurred eighteen months before from a slip of the foot while carrying a heavy load. Was operated on by the lap-joint method, with kangaroo tendon sutures. The union was considerably delayed by a suppuration of the wound, but a firm scar was the final result. He was discharged March 16.

Case 47.—February 23, 1898. F. T.; aged 49 years; a native of Ger-

many. Right oblique inguinal hernia. Was caused by a fall. Was operated on by the imbrication method, with chromicised catgut sutures. Owing to the too frequent occurrence of suppuration when the Marey kangaroo tendon was used, I abandoned it for the chromicised catgut, sterilized by boiling in absolute alcohol under pressure and preserved in hermetically sealed tubes. Primary union. Was discharged March 15.

Case 48.—March 11, 1898. C. H. D.; aged 50 years; a native of the United States. A very large right oblique hernia, scrotal, of eleven years' standing. Was caused by lifting a barrel. A variety of trusses had been worn, but without comfort or success in retaining the hernia. Was operated on by the lap-joint method, with chromicised catgut sutures, and was followed by primary union. Was discharged March 31 and reports that scar is very firm.

Case 49.—March 16, 1898. J. C.; aged 35 years; a native of the United States. Left oblique inguinal hernia, which had occurred one year before. Operated on by the lap-joint method, with chromicised catgut sutures. Primary union. Was discharged April 4, and has not been seen since.

Case 50.—March 17, 1898. F. L.; aged 31 years; a native of Russia. A left oblique inguinal hernia, which had occurred one month before while pulling on a rope. Lap joint method, with chromicised gut sutures. Primary union. Discharged April 4.

Case 51.—March 18, 1898. G. H.; aged 46 years; a native of the United States. A large right oblique inguinal hernia, scrotal and irreducible, on account of adhesion of the omentum to the sac. It was of seven years' duration. Imbrication method, with chromicised gut sutures. Primary union. Was discharged April 6, and is now serving in the United States Volunteer Army.

Case 52.—March 19, 1898. N. D.; aged 35 years; a native of Finland. Right oblique inguinal hernia of two years' standing. Was operated on by the imbrication method, with chromicised gut sutures. Primary union. Discharged April 7.

Case 53.—March 25, 1898. C. H.; aged 53 years; a native of Denmark. Right oblique inguinal hernia, which was operated on by the imbrication method and followed by primary union. Discharged April 23.

Case 54.—April 9, 1898. P. M.; aged 37 years; a native of the United States. Left oblique inguinal hernia of three years' standing. Was caused by lifting the end of a spar. Was operated on by the imbrication method, with chromicised gut sutures. Primary union. Was discharged April 28.

Case 55.—April 14, 1898. T. B.; aged 30 years; a native of Australia. Left oblique inguinal hernia of two years' standing. The testicle, which was high in the canal and atrophied, was removed with the sac. The canal was then closed by the lap-joint method. Primary union. Discharged May 4.

Case 56.—April 16, 1898. J. W.; aged 33 years; a native of England. Double oblique inguinal hernia. Both were operated on at the same time by the lap-joint method, with chromicised catgut sutures. Primary union. Discharged May 5. Result excellent when last seen.

Case 57.—June 10, 1898. Dr. C. B. Ford, operator. J. D.; aged 46 years; a native of the United States. Right oblique inguinal hernia. Was operated on by the lap-joint method, with chromicised gut sutures. Primary union. Was discharged June 26.

REPORTS ON TUBERCULOSIS IN RIO AND ON THE ETIOLOGY OF BERIBERI.

By Sanitary Inspector W. HAVELBURG.

PREVALENCE OF TUBERCULOSIS.

Among the diseases which constantly prevail in Rio de Janeiro tuberculosis occupies the first place. It causes the greatest number of deaths, and, therefore, it may be proper to report particularly thereon.

In order to prove the great mortality from tuberculosis I present the following table:

Mortality from tuberculosis.

Year	Deaths from tuberculosis.	Total deaths.	Death rate.
			<i>Percent.</i>
1886	2,077	12,659	16.5
1887	2,025	15,012	13.5
1888	1,990	11,418	17.5
1889	2,177	17,784	12.3
1890	2,202	13,725	16.0
1891	2,378	23,849	9.5
1892	2,170	18,996	19.4
1893	2,121	13,523	15.7
1894	2,127	19,360	11.0
1895	2,434	18,226	13.5
1896	2,631	19,604	13.5
1897	2,421	14,287	16.9

If we consider that the city of Rio de Janeiro is of large extent, that the people for the most part live in one or two story houses, and spend a great deal of time in the open air on account of the climate: that manufactories here are not yet so much advanced as in many other large cities, so that the air is not so much contaminated by them, in short, that in many respects the natural hygienic conditions of Rio de Janeiro are more favorable than those of other large cities, then the importance of the foregoing figures assumes much greater proportions.

The people of north and central Brazil are in general of low stature and very thin, with tender bones, so that they are inclined to what is called a predisposition to consumptive habits. The constitution of Brazilian women in general is still another cause for suspecting in them a disposition to consumption. The vital resistance is, speaking in general terms, considerably reduced. The damp, warm climate is, as is known, very favorable to the propagation of tuberculosis. Therefore all the circumstances are highly conducive to the development and

increase of the tuberculosis germ, which already exists here and is so widely prevalent.

No precautions whatever for preventing its propagation are used. The sputum is carelessly expectorated by the patients; its danger is not generally known. Even if it is expectorated into a spittoon it is not properly disinfected, and the possibility of the particles being carried by the breeze after drying is not generally realized.

In view of the great number of consumptive patients, it is evident that Koch's bacillus of tuberculosis exists to a great extent in the habitations of the people, and we know from scientific investigations how this germ is preserved on the walls and tapestry and in the dust, etc.

Climatic treatment, which is much used in Europe, is impracticable here. There are, indeed, some localities (Campos do Jordao, Barbacena, etc.) which are well known for their immunity from consumption. I do not know whether their reputation is well founded. However, patients who repair to those places are unfortunately obliged to deprive themselves of the greater part of the requisites for the proper treatment of the disease, therefore the result of the treatment is very doubtful. In my own medical experience I have seen no real success.

The treatment of patients and the means adopted for the extinction of tuberculosis consists merely in administering medicine. But we know how impotent are purely medicinal measures from an etiological point of view. In regard to the symptoms of consumption we can certainly do something; in regard to the etiological cause nothing. In this country the modern scientific and practical efforts for constructing special sanitary establishments have received hardly any attention.

Precautions for protecting children against infection are entirely insufficient. Many children are directly infected from hereditary causes or from close and constant contact with their parents.

Another source of infection, principally for children, is the cow's milk with which they are fed. In this country tuberculosis prevails to a great extent among cattle. There is no inspection of the animals by the authorities.

In the city and its suburbs it is usual to milk the cows in the presence of the buyer, which is useful for the latter's protection against adulteration. The milking is done in the open streets. No care is taken to insure the cleanliness of the udders or of the hands of the milker. Thus suspicious particles of foreign matter may enter the milk.

Other important measures for combating the disposition to tuberculosis, such as hardening the body in different ways, as for instance by gymnastic exercises, which contribute to physical development, and by a strict attention to methodical alimentation, are taken by the public here into little account.

I regret to say that, in my opinion, there is little probability of any change in the hygienic conditions relating to tuberculosis. By the

action of the authorities much certainly can be done; but the most important part belongs to private initiative and the cooperation of everyone in his own sphere.

RIO DE JANEIRO, *June 21, 1898.*

ETIOLOGY OF BERIBERI.

In former reports I have laid stress upon the fact that beriberi has become here an endemic sickness and deserves most consideration. In the message, with which the parliament some days ago was opened, the president, speaking about the sanitary conditions of the union, has also designated yellow fever and beriberi as those two diseases whereto the government is obliged to direct its attention.

Some days ago Dr. Francisco Fajardo made to the Academy of Medicine a communication, accompanied by microscopical preparations, and he thinks he is on the track of the cause of beriberi. Dr. Fajardo is a well-prepared and earnest colleague, and I am well acquainted with him. Dr. Fajardo has made his studies in the beriberi hospital on 52 sick persons, including 6 necropsies. He found in the red corpuseles of the blood a form of plasmodium which can be colored highly. With regard to the morphological qualities this hæmatozoa has great resemblance to the plasmodium malariae. There are also formations of pigment, principally in the liver and spleen; however, in the blood, it is seldom met with. The resemblance to malaria is evidently recognizable.

I beg to observe that I have seen in my practice from time to time persons who are declared by other physicians to be suffering from beriberi, but whose disease I considered as cases of a paludal infection. Of course I only refer to the subacute and chronic forms of beriberi, in which the symptoms of the polyneuritis are not so evident, and the symptoms of a dyscrasia and of the œdema appear more evident. The differential diagnosis is so much more difficult, as the change of the locality or a sea voyage has a good result on both malaria and beriberi, and consequently the logical conclusion "post hoc, ergo propter hoc," falls short here.

At all events, I thought it convenient to refer you to the above, so that eventually competent examiners, who have the opportunity for such studies, may devote their attention to this important ætiological question.

RIO DE JANEIRO, *May 10, 1898.*

STATISTICS OF THE PASTEUR INSTITUTE AT RIO AND REPORT
ON THE VACCINATION INSTITUTE IN THAT CITY FOR THE YEAR
1897.

By Sanitary Inspector W. HAVELBURG.

From the date on which in Brazil the prophylactical treatment against hydrophobia was commenced up to June 30, 1898, 4,068 persons have applied for the assistance of the Pasteur Institute, here existing under the direction of Prof. Dr. Ferreira dos Santos. Of that number, 2,695 persons have been treated, 172 last year. Treatment has been refused to the persons bitten when it was discovered that the animals were not suffering from lyssa. In two instances it was subsequently discovered that persons rejected on the plea of not having been bitten by rabid animals had actually been so bitten, having shown symptoms of hydrophobia. Three other patients were rejected because they had already been attacked by lyssa when they applied for prophylactical vaccinations.

Of the 2,695 persons treated, 1,935 had been bitten on uncovered parts of the body and 760 through the clothing.

Application was made in 10 instances by employees of the institute on account of accidents occurring during experiments with animals; in three instances sores, resulting from other causes, were contaminated by contact with the saliva of affected persons, and in two instances the patients were bitten by persons suffering from hydrophobia. As for the rest, the wounds were caused in 2,383 instances by dogs, in 287 instances by cats, in 2 instances by mules, in 1 by a cow, in 2 instances by asses, in 1 by a horse, and in 4 instances by monkeys.

In 237 animals the existence of rabies was shown by the experiments; 1,196 animals showed undoubted symptoms, and 1,262 animals highly suspicious symptoms of the sickness.

The number of persons who did not await the termination of the treatment and that of those in whose cases it was discovered that the animals by which they had been bitten were not suffering from hydrophobia was 99. Among those included in the former class there were 3 who are known to have been taken with hydrophobia after leaving the institute. In 6 cases of patients under treatment the lyssa made its appearance before termination of the treatment. During the treatment 5 patients died of other diseases.

Of the 2,585 persons treated, 20 died from hydrophobia, the mortality resulting from this disease being consequently 0.77 per cent. In these 20 cases hydrophobia appeared in 9 instances within fifteen days after the treatment had been completed.

Before the announcement of Pasteur's discovery the mortality from rabies, according to Leblanc, was 16 per cent.

One thousand five hundred and forty-five persons treated were residents of the city of Rio de Janeiro; the others came from different parts of Brazil.

RIO DE JANEIRO, *July 11, 1898.*

REPORT OF THE VACCINATION INSTITUTE.

The number of vaccinations in the institute was 2,241; revaccinations, 355; total, 2,596.

The law requires obligatory vaccination till the sixth month of life. Six hundred and fifteen cases are subject to this law. One thousand six hundred and twenty-six vaccinated persons are between 6 months and 40 years old. Of the 2,241 vaccinated, 807 did not return. Without exception, the result was favorable in 1,434 persons. The revaccinated, between 5 and 25 years old, are, for the most part, persons who want for their purposes certificates of vaccination effected.

In houses crowded with people were vaccinated 2,032 persons, and revaccinated 599. In inns and boarding houses of lower class a great number of vaccinations was done; in private houses 100 vaccinations and 249 revaccinations.

During the year 1896, the schools of the city of Rio de Janeiro were revised; during the year 1897, the schools of the suburbs; 68 and 1,330 pupils have been vaccinated and 2,792 revaccinated.

In different establishments and manufactories, 390 vaccinations and 1,015 revaccinations were done.

Three hundred and seventy-three streets with 1,677 houses were revised, and there has been vaccination 4,152 times and revaccination 4,655 times. Altogether were performed 6,393 vaccinations and 5,010 revaccinations; 108,026 tubes of lymph have been distributed.

During the year 1897, were notified 135 cases of smallpox, of which 93 cases were in soldiers. Death occurred in 2 cases. There happened in the month of September, 13 cases; October, 42 cases; November, 36 cases, and December, 15 cases of smallpox.

Since January of last year a "gabinete bacteriologico" exists, joined to the institute. Of 26 cases of diphtheria which were declared to the authorities, the bacteriological examination was executed 14 times, of which 12 times the examination was made in the institute.

Three patients died of diphtheria.

Through the institute were distributed gratuitously 273 bottles of serum, prepared by Roux, and 86 bottles of serum antistreptococcique, prepared by Marmorek.

ARTICLES ON YELLOW FEVER:

ITS NATURE, DIAGNOSIS, TREATMENT, AND PROPHYLAXIS. AND QUARANTINE
REGULATIONS RELATING THERETO.

YELLOW FEVER, ITS NATURE, DIAGNOSIS, TREATMENT, AND PROPHYLAXIS, AND QUARANTINE REGULATIONS RELATING THERETO.

The following articles and letter of transmittal were published and transmitted in book form to quarantine and health officers, and others:

LETTER OF TRANSMITTAL.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL,
MARINE-HOSPITAL SERVICE,
Washington, D. C., June 15, 1898.

To the Honorable

The SECRETARY OF THE TREASURY.

SIR: I transmit herewith, arranged for publication with your approval, a number of articles by officers of the Marine-Hospital Service relating to yellow fever.

These articles have been prepared by my direction by the officers of the service, whose valuable work in connection with yellow-fever epidemics has made them particularly well qualified for conveying the information herein contained.

No similar work has ever been published, and while it is to be hoped that with the advancement of scientific medicine a positive knowledge of the true nature of yellow fever will before long be acquired, and that the measures for its prevention will be more accurate and certain through this acquired knowledge, yet the information herein given is at the present time pertinent and necessary.

It is proposed to transmit this volume not only to the medical officers of the Marine-Hospital Service, but to State and local quarantine officers and to others to whom a plain statement of the method of diagnosis of yellow fever, its treatment, and the measures for the prevention of its introduction into the United States, and for its suppression when it has passed the boundaries of this country, will be of immediate value.

I have the honor to remain, respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General, Marine-Hospital Service.

Approved:

L. J. GAGE,
Secretary.

CIRCULAR LETTER ON DIAGNOSIS OF YELLOW FEVER ADDRESSED TO CERTAIN PHYSICIANS ON THE GULF COAST.

By Surg. R. D. MURRAY.

MOBILE, ALA., *May 28, 1898.*

DEAR DOCTOR: I have prepared a short letter on the importance of early diagnosis of cases of yellow fever, which I have arranged to send to every physician on the coast. As you are associated with me officially I will repeat to you what I have written them and add some arguments to increase your usual interest and perhaps give you some extra aids in prompt diagnosis.

* * * * *

DISCOVERY OF FIRST CASES ENABLES SUPPRESSION OF EPIDEMICS.

It is well known that first cases can be prevented from conveying the disease. Every prevalence for years has shown this, and the results of prompt and proper action at Perkinston, Miss., and Franklin, La., and in other towns during the past season should stimulate every physician to "catch on" to the first cases. A man is not a scoundrel because he suspects a case, nor a fiend because he finds a first case. But a doctor is culpable if he slurs over a case and hopes against his judgment in order to save his precious record with a vacillating public. I can not quite agree with Dr. Guiteras that we can inure our people to prompt announcements of suspicion and actual cases, but I know the people will fully trust us if our words and conduct are apparently in behalf of their final interest.

It is easy to call every illness "yellow" a month after other towns have quarantined, but it is not easy to decide on an individual case when no warning has been given and no source of infection is read about every morning.

DO NOT BE DILATORY IN REPORTING FIRST CASES.

It will not do to advocate the notion that any place is free from the chance of infection, nor to insist that all the old-time symptoms must be present, with a death or two added, before one suffers with a twinge of honesty and risks his present prosperity by doing what should be done with a first case.

False alarms
not so bad as neg-
lected cases.

Scares and false alarms are hurtful, but they do not usually kill. I would as little trust an alarmist as one who "would die before he would report a suspicious case." Duty to one's self, to one's family, and to all communities demand careful observation of every fever case, with proper action in case there is reason to suspect yellow fever. A lot of "rejected" cases have spread the infection. It is established that only yellow fever makes yellow fever, but it is not so well known that a mild case of yellow fever is as dangerous as a case that ends fatally in sixty hours. I think the mild case much more dangerous than a "genuine" one.

"MILD CASES" ARE DANGEROUS DISEASE SPREADERS.

Mild cases most
dangerous from
sanitary stand-
point.

Now, to quicken your senses, to increase your usefulness, and to assist you in giving your best efforts to your people I presume to give you some hints as to discovery of first cases. I do not claim to be expert, but I have a long record of lucky decisions which warrant me in speaking freely to those who have been so fortunate as to have an abiding place or a place called "home." I am not infallible, but I am in earnest in my desire to do good to others and to save my people from the horrors of an epidemic and the provocations of quarantine. Mild cases of yellow fever are the mildest cases of disease that can be seen. Walking cases, nursing cases, and transient cases are more common than doctors realize. Mild cases transmit infection as easily and effectually as bad cases, and thus make "genuine" cases in the proper persons. Mild cases are not so quickly apprehended as severe ones, but they can be isolated more easily and at less expense than bad ones. Mild cases are the cases to look out for.

Don't wait for
black vomit be-
fore announcing.

It is not true that a prevalence of the disease must be begun by a death or black vomiting. It is true that a walking case introduced the disease into a village last year where the earmarks of yellow fever were shown the best, and the results were worst in comparison with all other infected towns of which there is a record.

Hibernation.

I do not believe in recrudescence or hibernation of the fever in small towns or in the country, but many health

officials do, and as there is a possibility that all is not known of past epidemics and that there is much to be learned yet of the yellow-fever pest, it behooves us to be watchful—first, for the sake of our professional probity, and second, in the interest of our people.

I am reiterative in order to gain your attention. Pardon me if I seem to be prolix.

POINTS TO BE CAREFULLY NOTED.

First. As to the region lately beset by the Cuban plague, permit me to remind you of what the doctors think—i. e., that the disease recurs; this remark is to prepare you for rumors that there is yellow fever in your practice or community *now*! So be prepared to affirm or deny by the card. Note taking is a good thing for doctors!

Second. If there is reported yellow fever within the communications of your place, suspect every case of febrile disease but say nothing! Get to thinking! Here is the chance for careful observation and some taking of notes. Not long ago a physician blundered as to the date of his first visit! His memory of the pulse, temperature, and nausea was of same sort—his patient died.

Keep careful
notes.

Third. If called to any person who sickened in the night or early morning and complains of headache and malaise or body and leg ache with some stomach distress, suspect the case and make inquiry as to where he got it. A chill is called for in the books, but one sufficiently severe to be told of to you is rare; there will be a story of chilliness or waking up in discomfort. Distress in the early morning is a rule; a failure to eat a good breakfast is a bad omen, but hints at a mild case. Fever of 101 to 103 with pulse of 110 to 120; cutting pain through the forehead, with aching eyes; fullness of eyes with some pain and suffusion, generally with injection are probable signs. The back and thighs will be sore in a severe case; there is some soreness in the mildest cases. Severer cases will have pain in back of neck and in calves. Ask few questions. Press firmly and deeply over where you think the gall bladder lies and you will generally elicit a squeak—don't mention it! The face will be full and less mobile than in health with a fullness of the upper lip rendering a smile less gracious.* These signs depend somewhat on an acquaintance with the person. The cheeks will be of a dusky red color—more or less—and depending on the patient's color;

Initial chill.

Duodenal
pain.

Swollen lip.

* Passed Assistant Surgeon White reports that he made two diagnoses with the swollen upper lip as the first noticeable symptom.

sometimes faintly purplish. Sweating will diminish these face signs in a few hours. The injection of the sclerotics will increase until after thirty-six hours some yellowing may be observed; in children, the eyes will remain pearly excepting the suffusion and the red streaks; some exceptions. Frequently pressure on the eye balls will cause complaint—sure to do so in bad cases. Primary complete or semi constipation is always present. I never heard of a diarrhœic person being attacked. The cases you hear of will bear explanation or further inquiry.

Constipation.

Sluggish circulation.

The circulation in the skin will be faulty; the skin may be streaked by the passing finger or paled for a quarter of a minute by pinching; this is a good sign, and best after thirty-six hours. The skin will be moist, as a rule, and will keep moist to the end, whether medicine is given or not. In diagnosis early or for first cases don't look for yellow skin. The pain of back and legs will be in the muscles and not in the bones and joints; you can make this point by care; squeeze the thighs or calves. Note that unless there is nausea or headache the person lies quiet. (Vide dengue.) There will be less rapidity of the pulse than the height of fever warrants, judging from lung disorders and enteric fever. Do not blunder over one who smokes too much, for his pulse will count less when he reduces his daily quantity or has to quit smoking. Also, consider the effect of your presence on your patient's excitability. The pulse should be counted without the patient's knowledge. After two and a half or three days the pulse will fall below 70 and later on lower yet; fright and irritations will prevent the slow beating from being observed.

Pulse rate.

The above signs are sufficient to warrant isolation and disinfection of all discharges, clothing and discarded bedding, even if there is no known fever within a thousand miles. Also, warrant for sending for me if you need me. Please note that these signs may be in minimum—any old nurse can comprehend the maximums. After sixty hours there should be some albumen in the urine—it is possible for no urine to be procured and that no albumen is found. In women urine is not reliable; in children it is difficult to get. But it must be obtained. Do not confound albumen with mucin and do not treat other symptoms lightly because you do not get albumen.

Urine.

Stools.

At this stage some brown mucus, or black discharges, or "bismuth" stools may be looked for rather early in mild cases—may be late in severe ones. This is only confirmatory; rather late for diagnosis. So with nausea and vomiting. Mild cases suffer with distaste for usual food only.

Of course there is anorexia from the beginning; usually vomiting of the last food taken; bile will be vomited early if the early nausea is not checked; no bile will be vomited after about thirty-six hours if the patient has had proper bowel actions. Anorexia.

After vomiting of last food taken and a little bile the vomit will usually be white, and will remain so until blood oozes into the duodenum or stomach. As to black vomiting, do not be hypercritical, the chances are vastly in favor of yellow fever. Please notice the hiccough and retching, and listen to the black fluid regurgitating through the pylorus into the stomach. But this is rather late for diagnosis of a first case, and is not applicable in mild cases. Mild cases demand examination of the feces. Always consider the chances of infection to and from your patient. Pyloric regurgitation.

DIFFERENTIAL DIAGNOSIS.

Yellow fever is like a language; you should know something of others. Differentially considered, dengue has a demonstrable rash in the fauces always, between the shoulder blades, generally, and often over the big joints and on the trunk. The pains of dengue are *in* the bones and joints. A dengue patient is in pain and can not lie still—he don't want to get up. Yellow fever pains, except the head, are in the muscles, and the patient after four or five days is comfortable *in* bed, but wants to get up and do a lot of work. He gets up only to faint and return to bed. The dengue patient gets up, but keeps on growling about his pains. This is a late distinction, but it is valuable. Differentiation from dengue.

Malaria is usually prodromed for some days by malaise, loss of appetite, discontent, and a general tired feeling. It nearly always attacks in the daytime or when the victim is at his work, and is ushered in with a positive chill. Constipation is the rule, but not so marked a feature as in yellow fever. The malarial tongue is full—swelled—too big for the mouth—tooth marked and heavy coated, with white edge and yellow or dirty top area. A yellow-fever tongue is rarely indented—if it is, there is malaria in the patient; it soon shrinks and gets a red edge and red tip; the red tip is diamond-shaped, the front of the diamond being made by the edges. I do not know about the congestion of the vessels under the tongue in yellow fever and the paleness of same in malaria. You, may be, will have a chance to make observations. From malaria.

Malarial vomiting is attended with more bile than is usual in yellow fever; this is a guess-point in diagnosis, but

the statement is true. Malarial attacks generally permit the fever to decline without medicine and the fever will not cease unless medicine is given. Another good point in differentiation is the presence or absence of labial herpes in convalescents, particularly in young persons; herpes does not occur in yellow fever cases; it is common in malaria. Of course, this is a late sign so far as the individual is concerned, but it has aided me much in giving a hint as to what the other sick one suffers with.

Malaria and
dengue.

As a hint for you to consider in deciding on the first case permit me to say that the yellow fever patient gets up "all knocked out; was never so weak in my life after so short a sickness;" the dengue patient gets up "sore and tired; ache all over yet;" the malarial patient is able to work every other day. Another hint, but late for diagnosis: the yellow fever patient is mentally alert; the dengue patient complains much; the malarial don't care much. These points do not apply to individual cases, but are valuable if you have a number of patients to visit.

I have given you sufficient reasons, symptoms, and signs to either put you on your guard or to permit you to act for the benefit of all. Yellow fever is not a "bogey," neither is it uncontrollable.

I hope you will duly consider the *possibility* of cases occurring in your rounds and also the importance of early action in first cases.

I am at liberty to visit you on call by letter or telegram at any time at no expense to you or your clients, and to the best of my ability and the limit of my time I will be glad to serve you.

Please notice that rumors of fever are plenty here and there, and consider that a prompt denial will oftentimes prevent a panic; also a prompt notice will save lives by permitting orderly exit from danger centers.

Examination of
blood.

The service has arranged to have samples of suspected blood examined by the new agglutinative test by Dr. Archinard, of New Orleans. Samples of malarial blood can be examined in the hospital at Mobile. If you wish special instructions please make request of me.

In return for what I hope to do for you I request that you send me, at least, a weekly report of health conditions in your region and that you inform me in detail of all rumors and suspected cases. As I am pretty well acquainted with the town and people it is needful that I get names and addresses. Sometimes it may be advisable for me to go in person, and if I know the residence can save

much time by going direct from depots. Again, if I have names I can from time to time refute the secondary rumor without doubt as to persons and places.

I fear I have tired you, but I am so desirous of enlisting your aid and arousing your interest in this very important matter that I am willing to be blamed for prolixity.

Command me in any way, personal or professional.

Yours, sincerely,

R. D. MURRAY,
Surgeon, Marine-Hospital Service.

DIAGNOSIS OF YELLOW FEVER.

By Acting Asst. Surg. JOHN GUITERAS.*

When ordered by the Government to inspect points in the South as a yellow fever expert, I have assumed it to be my duty, not solely to report upon the diagnosis of individual cases, but to form an opinion as to the actual state of the outbreak, whether it be possible to localize it and stamp it out; or, on the other hand, whether the outbreak is beyond the control of our means of sanitation. I have even deemed it possible, when yellow fever was not found in one of the Southern States, to predict whether it was likely to break out or not during the summer. The diagnosis, then, from my point of view, is of two kinds, namely, as to the epidemic status of the locality, and as to the individual cases.

A careful study of the conditions existing in Cuba during the earlier part of the present summer made it very probable that yellow fever would extend from that island to this country. There probably has never been so much yellow fever in Cuba as there has been during the present season.

DETERMINATION OF EPIDEMIC STATUS.

First, as to the epidemic status: There are several features characteristic of the community where yellow fever is prevailing that make the fact known to an experienced observer, even when willfully or otherwise its presence is denied by the physicians and local authorities. Without seeing a single case of the disease I have often made up my mind as to the existence of yellow fever from the reports of prevailing sickness given by the physicians.

In the first place, many cases of acute febrile attacks of mild character are reported and an attempt is made to show why they can not be cases of yellow fever. They are usually ascribed to an epidemic of dengue or to a prevailing malarial infection. The report that some of these cases have shown albumin in the urine becomes extremely suspicious. Fatal cases are reported, but some intercurrent disease or previously existing condition is supposed to be the cause of the fatal termination. On investigation it is found that most of these cases are of

* Acting assistant surgeon Marine-Hospital Service during the yellow fever epidemic of 1897.

young people. Very often one or two physicians are found in a locality who positively declare that they have seen extremely suspicious cases or positively diagnosed such cases yellow fever. These physicians are generally younger members of the profession who have never seen the disease. It is a matter of experience that usually the older physicians acquainted with the disease in former epidemics fail to recognize these early cases and are the last to become convinced of the existence of the disease.

Convalescents from yellow fever may be discovered also on the streets. An icteroid hue of the eye persists usually for some time after recovery, and I believe not rarely shows itself also as a premonitory symptom of an attack.

Another aid toward forming an opinion is found in the study of the mortuary records. A comparison should be made between the present time and the preceding year. Sometimes this investigation is in itself enough to give strong presumptive evidence one way or the other. The characteristic feature of the mortuary records is the increase in the number of deaths among the white population. The class of the white population especially affected varies according to the manner of introduction of the disease. It may affect especially the sailors, or children, or railroad people. Even when there is no marked increase of the death rate of white people we may find causes of death that are suspicious. For instance, young adults dying of congestion of the stomach, congestion of the brain, purpura hemorrhagica, meningitis, Bright's disease, bilious remittent fevers.

DIAGNOSIS OF INDIVIDUAL CASES.

The diagnosis of individual cases of yellow fever is, in my opinion, very easy. There is no acute febrile disease in which there are as many signs that may be called pathognomonic. The diagnosis of the disease rests upon three such symptoms; namely, the facies, the albuminuria, and the want of correlation between the pulse and temperature. I rely mainly for my diagnosis upon the facies, which I consider extremely characteristic. However, as I consider it my duty to convince the local practitioners of the existence of the disease, I make it a rule not to announce officially the existence of yellow fever until I have been able to show the presence of albumin in the urine. My own mind, however, is generally made up by the simple inspection of the patient, and I almost invariably find my opinion confirmed on the second, third, or fourth day by the appearance of the albuminuria.

FACIAL APPEARANCES.

The appearance of the face is that of typhus fever during the first forty-eight hours of this disease or like that of measles before the eruption breaks out, with a more or less pronounced icteroid hue. It

is the latter feature, I believe, which gives the face its characteristic appearance. In the first twenty-four or forty-eight hours it is by no means a distinct jaundice. The physician to whom I am showing the signs of the disease usually expresses surprise when I state that jaundice is present. It is, of course, best noted in the sclerotics. It is hidden, however, by the marked injection of the smaller vessels. The icteric hue is often better seen at some distance from the patient than when the eye is closely inspected. It seems to show itself in waves with the different movements of the eye. Possibly this is the result of transient contraction of the vessels of the conjunctiva or of the different angles of reflection of the light upon the eyeball. In severe cases, and on the second and third day of the disease, the jaundice becomes more prominent. It will show itself in distinct waves as the capillaries of the skin contract with the movements of the facial muscles or it may be brought out by taking up a fold of the skin between the fingers, when the contrast between the yellowish, anæmic skin and the surrounding congested areas will become well marked. Later on there may be well-marked jaundice. By this time usually the florid color of the face has been replaced by a more dusky hue. In the later stages of the disease there are also characteristic features of the facies in grave cases. The mind is usually clear, and there is a peculiar alertness and watchfulness that is not seen in other acute febrile diseases. The physicians who have not seen yellow fever for many years seem to have this peculiar phase of the later stages of yellow fever impressed upon their minds. This, however, is too late a diagnostic sign for my purposes, and besides it does not appear in mild cases of disease.

ALBUMIN.

The albumin appears in the urine usually on the third or fourth day of the disease. It may be very transient albuminuria. In many mild cases the albumin is present only in the urine passed in the evening of the third or fourth day. In many cases it is only a trace, but even then by a careful centrifugation granular casts may be found in the urine. In severe cases the quantity of albumin may be very great and the different forms of casts characteristic of acute parenchymatous nephritis are found in abundance in the urine. Now, there are many acute febrile diseases in which albumin may be found in the urine, but in none of them so constantly nor so early when in connection with such mild manifestation of the toxæmia. In all such diseases the albuminuria will be found at the end of the first week or during the second week, and as an evidence of persistent high temperature and intense toxæmia. Cases of yellow fever corresponding in intensity with these present at the same time such characteristic features, that it is impossible to mistake them. The difficulty of diagnosis can only be met with in connection with mild cases.

PULSE AND TEMPERATURE.

The third characteristic symptom of this disease is the want of correlation between the pulse and the temperature. This may be a rather late manifestation and may be absent, especially in children. It should be remembered that the characteristic feature of yellow fever in this connection is not a slow pulse during the convalescence or even during the defervescence of the fever. The characteristic features is that quite often we find that at the same time that the temperature may be rising the pulse will be falling. On the third or the fourth day of the disease, for instance, with an evening exacerbation of half a degree or 1° of temperature, we may find that the pulse is perhaps 10 beats slower than in the morning. I have seen, however, the same discrepancy in cases of true dengue, and in the Tropics also, in connection with other febrile diseases. Still, this is exceptional. In dengue the excessive fall of the pulse presents itself with a distinct defervescence of the temperature, and I suspect that many cases that are reported from Cuba of slow pulse in typhoid and malarial fevers may have been cases of yellow fever.

USE OF THE MICROSCOPE.

An erroneous belief has prevailed throughout the South, especially among physicians who were not practical microscopists, that the microscope should be an important aid in the diagnosis of yellow fever. It appears that poorly prepared abstracts from the work of Sanarelli have led many to believe that a characteristic feature; the bacillus of Sanarelli itself, was found on examination of the blood. Now the truth is, that even with the assistance of post-mortem examinations, Sanarelli was able to discover his bacillus in 56 per cent only of the cases of yellow fever. He would be a poor clinician, indeed, who could only diagnose about one half of the cases. The truth is, however, that during life the microscope could not establish a positive diagnosis. As far as our present methods go, it would be impossible to distinguish between a drop of yellow-fever blood and blood from a healthy man.

Negative evidence may be presented by the microscope. The presence of the plasmodium malarie, for instance, would prove that a case was suffering with malarial poisoning, and presumably not with yellow fever. But the differential diagnosis between these two diseases is usually easy. The bilious remittent fever, that in our old text-books of medicine occupied a conspicuous place in tables of differential diagnosis with yellow fever, has practically disappeared from the Southern sea border since yellow fever ceased to be an endemic there. It was, in fact, the yellow fever of the natives and of places in the interior. The former were supposed to possess in a certain degree immunity against yellow fever, and the disease was believed to be restricted almost to the littoral.

The plasmodium has been found in the blood in cases of yellow fever.

The mistake made by the board of experts of New Orleans, when they failed to recognize the existence of yellow fever at Ocean Springs, was due to the finding of the plasmodium in at least two of the cases.

DENGUE AND YELLOW FEVER.

The prevalence of a widespread, mild, epidemic fever during the present outbreak of yellow fever has been undoubtedly a source of doubts and difficulties in connection with the diagnosis.

Many of these cases were found to exist in houses where cases of yellow fever were present at the time, and I must confess that it was impossible to discover in them any of the characteristic symptoms of yellow fever. Many of these cases had a distinct eruption and must be looked upon as cases of dengue. This fact may bring forward new problems as to the relations between these two diseases. From our present point of view, we can only state that yellow fever appears to spread more easily when there is an epidemic of dengue prevailing. All evidence goes to show that a previous attack of dengue does not protect against yellow fever, and we must look upon the former as an entirely distinct disease.

IMPORTANCE OF DIAGNOSIS OF FIRST CASE.

I can not insist too much upon the importance of the diagnosis of the first case of yellow fever in a locality. Undoubtedly the cause of the epidemic of yellow fever is to be found in the introduction into a community of cases that are not suspected to be yellow fever. This probably occurs most frequently in connection with individuals of the colored race. The disease in them is usually very mild, and their movements from place to place are less likely to attract the attention of the health authorities. I have no hesitation in saying that if the first case of yellow fever introduced into a city were always recognized, the spreading of the disease would be invariably prevented.

I will conclude this report by inviting your attention to the fact that the movements of the yellow-fever expert have been frequently interfered with by the fears of the communities that he might convey the disease from place to place. In moving from one locality to another I took all the necessary precautions and felt absolutely sure that I could not be a source of infection. I was immune and traveled with very little baggage, which I frequently changed. Yellow fever has never been carried from one locality to another in this manner.

This fear of the communities was in part genuine and due to ignorance, but was also in part a pretended fear of those who knew better. I have finally to state that I have received every attention and assistance from the local health authorities in all the cities that I have visited.

TREATMENT OF YELLOW FEVER.

By Surg. R. D. MURRAY.

I have seen yellow fever in twenty-one summers (including 1870) and in every month except February. The elimination of yellow fever from our nomenclature will follow when there is a proper conception of the influence of clothing, bedding, and unclean bedrooms as transmitters. The disease is air borne for some distance; the infection is stronger at times and places than at others; whether it is intensity or quantity I do not know; it may be diluted, and is transmitted by clothing, bedding, and related articles. Hair from the dead has transmitted it; corn sacks, blankets, and old newspapers have carried it; mountains of filth will not produce it; they may give it a new nidus or garden from which it goes out "seeking whom it may devour." The cleanest town in the South may have a severe prevalence if the people insist on disobeying the advice of the health officials.

In 1875, as a result of several post-mortems and an attack of the disease, I came to the conclusion that yellow fever was an inflammation of the duodenum, primarily, and wanted to call it epidemic duodenitis. Many post-mortem examinations have since convinced me that the primary lesion is in the duodenum, and I insist that the mildest cases have a lesion in the organ referred to that can be demonstrated, if due care is taken. The same after-death examinations, as well as bed side experience, have shown me that the death-dealing process was not the "inflammation" that I was taught thirty years ago to understand as inflammation, i. e., there is no proliferation of cells or tissue and no new growth.

There is a primary involvement of the duodenum and the symptoms of the disease follow generally in regular order. The mildest cases have a tender duodenum (if you know how to press) and a *little* back ache; note how close

Certain ideas
as to pathology.

Duodenal ori-
gin.

Stools to be examined. to the spinal column the duodenum lies. If the stools could be *all* and carefully examined sometime a mass of white mucus with a black or brownish middle will be found. Maybe there will be a stool of black mucus once only. It is fair to say that there is always a clay or bismuth stool with the mucus clot stained with black. The "*bloody sweat*" from the duodenum, and in bad cases from upper intestines and stomach, starts in the duodenum.

Fulminant cases. Sometimes the symptoms come in such quick succession that we think the attack is necessarily fatal. Many times in such cases we have no chance to ask the patient how matters fared with him twenty-four or thirty-six hours before, when he was sick, but would not admit the fact. Walking cases are as common in this as in the other bed diseases. I have known a man, suffering with headache for three days on duty, to vomit black on the stairs on the way to his deathbed. I have given immune certificates to persons who never went to bed.

Choice of physician. In ordinary, the patient should like the medical attendant. If the physician is distrusted, he should be called off or feign illness, so that a favored one can be called in. Consultations over the patient are injurious. I would have the doctor do his share in keeping up courage, hope, and life-purpose in his patient; to minimize the aches, distress, and fears, and to carry his patient's mind away from the *now* with its dreads to *to-morrow*, with its reward or revenge. Several people are living now because, in their desire to take vengeance on me for what they thought was my indifference, they forgot themselves and their conditions.

Psychological effects.

NOT EVERY CASE NEEDS TREATMENT.

Mild cases

It is fair to say that of one hundred cases seventy-five need only to be let alone by the extra-attentive nurse or friend and heroic physician. They will get well under any plan of treatment and under miserable local conditions; notably so with infants, who, if they die, are generally sacrificed by curds or some acrid medication.

These seventy-five are "cases" and should be recorded, but only for sake of good records and to establish their immunity. They should receive only what occasion demands and be watched for untoward incidents.

Of the twenty-five some will need formal attention and careful procedure; others will die in spite of all reasonable aid. Some vicious habit or chronic disease will add to the trouble, and in some cases uncontrollable fear will insure a fatal result.

Age limits.

My oldest patient to get well was 109 years of age; the

youngest was 52 hours old when she threw up black vomit. One of my children had black vomiting five days after she was born. I know of the recovery of a chronic Bright's disease sufferer; of a morphiomaniac's recovery, and last summer gave a diabetic doctor such cheerful council that he had a severe attack without fatal result, and has been in better health since than before. I cite these cases to show the triviality of the disease if "taken right and in time." I have often said "Yellow fever is the most honest, most trivial, and cheapest to treat of all diseases that kill." It is "honest" because it comes with definite signs and leaves no trace, always insuring the afflicted one that he is hereafter immune; it kills, if at all, in a few days, and is merciful in the killing, as the doomed one is usually conscious to the last and does not linger as a consumptive or one afflicted with cancer; "trivial" because 50 per cent of those who suffer with it are scarcely aware of serious illness, and have no sequels to make them miserable the remainder of their lives; also, because it rarely takes off children, and they, by reason of the attack, gain the privilege of living in its habitat; "cheapest to treat" because it is so; the delicacies, liquors, etc., sometimes provided are generally consumed by the disbursers and attendants and are not fairly chargeable to the sick; the medicine actually needed costs very little.

Chronic diseases and habits as factors.

Yellow fever a frank disease.

Cheapness of treatment.

TREATMENT OF YELLOW FEVER.

When called to a man (most of my work has been with men) who has had a chill some time during the previous night, has a pulse of 100 to 112, with temperature of 101.5° to 103°, headache (*cutting* across the forehead), backache running down into the thighs, *sore* muscles, skin hot if you hold your hand on it a while (hands and wrist not hot to gentle touch), anorexia, white tongue (may be a yellow center far back—the red edges and red diamond on tip will not show at once), suffused eyes, and notably or faintly purpled cheek bones with semipuffed upper lip, the hundred chances are you have a case of yellow fever.*

Initial signs calling for prompt treatment.

* Yellow fever usually begins at night when the person is in bed and in a relaxed condition; malarial fever usually attacks when the person is at work. Regardless of books, I reasoned this point out as a diagnostic fact over twenty years ago, and am flattered that others discovered it too. Night watchmen have sickened in daytime. A restless early morning in bed with little desire for breakfast is a frequent history; everything eaten as breakfast does harm in such cases. Dengue pains are worst *in* joints—yellow fever soreness is between the joints. As malaria coincidents there is no rule for differentiation excepting *perhaps* the attack in bed or at work.

Initial purge
necessary.

Give three or four compound cathartic pills at once and as soon as possible give a hot foot bath (an all-over bath is better, but is not always possible), with or without mustard and salt. Mustard at this time is really a nonessential, but sometimes the patient thinks it is the proper thing; so with the table salt. As to the cathartic: calomel at first is too slow and usually must be sent for, the pills contain enough of it and *are* in your vest pocket. Every yellow fever doctor

Carry purgatives in your pocket.

should carry first doses of compound cathartic pills, compound acetanilide tablets, and such other pocket remedies as may be needed on emergency. A parade of a small medicine chest is not advised. Do not begin to make a reputation for wonderful medical skill now. Dwell on the dengue symptoms and the signs of malaria, and without great formality convince the patient that "it is not yellow,"

Don't let the patient know he is very ill.

but do not say so. Keep back information about the actual temperature all the way through, but tell them about the height of the fever. No patient should ever hear that his fever went above 102° until after he gets well. (I saved a doctor once by hiding his thermometer and using my French scale, which he could not translate.)

Coal-tar derivatives.

Give as soon as convenient, or, if fever is above 102°, at once, any coal-tar derivative in 7½-grain doses, with some bicarbonate of soda and caffeine. The antikamnia compound is a good one. If powders or tablets are objectionable to the patient, give antipyrine. I nearly always use acetanilide with soda and caffeine. Have no objection to any, except that I like cheapness and simplicity. After the bath and a good sweating, under blankets, for from four to six hours, rub dry and cover with two blankets. (The clothing should have been hung outside of the house

Disposal of changed clothing.

or dumped into a tub of water; dispose of the wet sheets and blankets in like manner. When washed they are ready for use again; this hint in regard to prevention of infection.)

If a person likes blankets next the skin, so much the better for prevention of skin shock. Quilts and counterpanes are objectionable because of the nasty odors they retain.

Drinks.

Repeat the coal tar derivative every three to six hours if fever keeps above 102°; give for effect and not pro forma. Have the face and hands wiped frequently, give orange-leaf tea, Apollinaris water, lemon-grass tea, hot lemonade, ginger ale, *small sips* of ice water, and other drinks ad libitum, but not ad nauseam. Always start with the quantity you are willing the patient should have, and let him drain the cup; this particularly in the case of water. Try to supply

fluid for the three or four days' sweating that will be kept up. Apollinaris is good on account of the common salt it contains; for some reason common salt is a good thing to give and has been grossly neglected. Passed Assistant Surgeon Smith, on duty at Ship Island last year, used it, methodically, about a drachm a day, with excellent results. I have always given much salt in the food, but never gave it dry. No spirits of any combination should be even thought of for the patient.

Common salt.

The first bowel actions should be had sitting up for the first thirty-six hours or so for physical reasons—and for mental reasons, too. If the bowels are not freely and comfortably relieved within six hours, give a small saline, and let the patient choose the kind. Castor oil is the best thing to give, but many so bitterly object to it that it is not advisable in all cases. Sulphate of soda is the next best. As a rule, the magnesias cause griping and flatulence. Seidlitz powders are good, but cause some gassiness and uneasiness—however, the patient should have his choice, as he feels bad at this time and an insistence on *one* thing magnifies his dangers, in his own mind. Sometimes an extra pill will do the hoped-for duty. I do not object to sirup of figs, castoria, or other cathartics—only want results. If nausea is present an enema is in order.

Bowels to be kept open.

DIET (OR LACK OF IT) A MATTER OF FIRST IMPORTANCE.

Do not *deny* food but give the milklike water of long-boiled hominy or corn meal, salted and strained through cheese cloth. Keep the pot boiling all the time! Rice water is good. Sago is better, as it is slightly aromatic, but my experience has been with the poor. Mexican atole is excellent—made from crushed lye-hominy. Sometimes it is well to *flavor* with a bit of meat juice. Chicken soup, with rice, so thin as to be equal to starch water, is not to be tabooed. The point is to give no food for four or five days, but to *appear* to give food regularly. Often you must promise food and abuse the nurse in the presence of the patient for the nonfulfillment of your orders, and then apologize to the nurse outside.

Diet

If the first form of antipyretic tires the patient, or seems to him to do no good, change the form; here laetophenin or amonol or antipyrine will serve as substitutes; may be capsules of the same as you were giving will accomplish the object sought. Do not forget the bicarbonate of soda and caffeine. Remember always that the *patient* is sick; not the doctor.

Antipyretics.

Conjoint infection malaria and yellow fever.

Here I must advise you to carefully consider the question of malaria, for the Laveran organisms can do their work while the yellow-fever germ is also active. In a malarial region it is advisable to give from 40 to 60 grains of a cinchona salt in the first twelve or twenty-four hours, in order to ward off or forefend a malarial chill which may occur during the period that should be yellow-fever convalescence. I lost two patients with *malaria* when they were convalescing from yellow fever twenty years ago. In nonmalarious regions, or on shipboard, no routine is necessary, but in Mobile, New Orleans, Scranton, or in the back country, care must be exercised. The preliminary cinchonidia or quinine may be given with the compound cathartic pills, and it is believed that early cinchona aids in producing calm in or to the patient. Do not give all at once, and do not expect the cinchona salt to act instead of the coal tar products. Give them together, or nearly so.

High enemata.

After thirty-six hours or so give an enema every day and try to have a bed pan used. It is impossible for many to use a bed pan; then have the patient helped up on a vessel or commode. Instruct the attendant that the patient must be *helped*, and not use his own strength. The patient's own muscular force must be saved somehow. If the expected action does not occur, give another enema with a long tube. A short catheter of 30 or 32 caliber should be in every yellow-fever doctor's pocket, which, attached to an ordinary self-injecting syringe, makes a "long tube." I and many others have saved lives by use of a large catheter. The catheter may be washed and used again. Do not fear infection.

Enemas may be made quickest with soapsuds and molasses; ordinarily soapsuds will suffice, later on not too strong. Consider the stools, and if they are not sufficient in quantity, and you have reason to believe there is a fecal matter *high up*, think of giving a dose of castor oil 2 drachms and olive (not lard) oil, 6 drachms, more or less as occasion seems to demand. Lemon juice is the best vehicle for the oil. Perhaps it will be better to tell the attendant to give the potion as if you knew nothing about it. Patients like to circumvent the doctor! I believe that

Oil catharsis.

small doses of castor oil and large doses of sweet oil will not produce the frequent contractions of the colon and the common intussusceptions of the small intestines that are found post mortem. Constant peristalsis *downward* is necessary; harsh purgation is to be avoided. This remark does not refer to the primary emptying of the bowel, but

to repeated emptying efforts by calomel or pills or salts to insure a daily bowel movement. Olive oil does not cause the bowel strictures that I dread—I think small doses of castor oil will not. I prefer to mix them, and have saved many lives by this plan.

For nausea use ice about the head, face, and neck. A piece of ice, wrapped in a cloth, rubbed rapidly about the lips, temples, and neck will keep down almost any offensive dose. If the nurse can not do it effectively or does it rudely do it yourself. Give cocaine in one-fourth grain tablets floated down the throat, repeating as required: solutions do not accomplish the object as well, and as the patients are human beings they might get poisoned. Dr. Thorington, of Colon, introduced cocaine as a remedy in yellow-fever nausea in doses of 2 to 3 grains in solution. I think I first insisted on *small* doses in tablet form floated into the stomach where it is needed. Bathing the face with vinegar frequently is excellent in subduing nausea. *Eau sedatif* is praiseworthy for the vinegar it contains. Elegant toilet waters are pleasing to all and possible to some. Mustard to the epigastrium is always to be resorted to, but avoid sickening the patient by putting the pungent mass too close to his nose. Look to the covering, the pillow, the mattress, the commode, the nurse's breath, or other condition as a cause of nausea. A fresh sheet or pillow case or pillow sometimes makes a "lot of difference" in the matter of comfort. Do not forget the bowel peristalsis; the "duodenal bloody sweat" may be trying to get up through the pylorus and maybe an enema from a long tube is now essential to produce quiet. To relieve restlessness and the aches and "tired feeling" it is well to briskly rub the legs and back with a coarse towel under the cover every three to six hours. Massage through the cover is sometimes grateful.

For nausea.

Cocaine.

Keeps surroundings clean and sweet.

Massages.

Albuminuria.

After sixty hours, in ordinary, examine the urine. If albumen appears as a *trace* give more fluids. If the quantity increases to from 5 to 20 per cent give turpentine in 7 or 10 drop doses every four hours. For 5 per cent albumen nothing but more fluid is necessary; if it increases to 75 per cent give more turpentine. Rub the chest and back with turpentine, not so much for absorption, but so as to put your charge in a turpentine atmosphere, to prevent him from smelling and tasting the medicine. Do not let the patient know you have examined or want to examine the urine; have portions saved without his knowledge. It is amazing what quantities of turpentine can be taken

Turpentine as a remedy.

without harm. There is no danger of strangury. I have given half, sometimes a teaspoonful, to children where there was suppression, and generally with good effect.

But it is not advisable to give all that may be considered necessary in a case at one dose. Turpentine is a diffusible stimulant and a good styptic; it is laxative also. I have never seen a particle of benefit follow administration of digitalis. Large enemas of water about the temperature of the air, or cooler, placed high up, do much good if they are retained. Please note that the kidneys are not inflamed, but rather paralyzed.

Cool enemata.

Sulfonal for insomnia.

For sleeplessness after second night give sulfonal in 15 to 30 grain doses, and repeat if necessary in three or four hours. Bromide and chloral are good, but are often borne badly. I used trional once with good result. Ofttimes sleeplessness is due to the odor from a dirty quilt or pillow; sometimes to a lumpy mattress. These may seem trivial, but it is a doctor's business to look out for his patient.

Good beds.

In some cases a woolen shirt—a sweater—is necessary, as in restless children and persons who will not keep the arms under cover.

Diet in convalescence.

As the fever subsides diminish the remedies and increase the food, but it is generally unsafe to give anything like milk or eggs before the fifth or sixth day. Your patient will not starve to death, but if he is fretted by a great lot of rules or unpleasant attendance and surroundings he may not get well.

COLLAPSE.

Treatment of collapse.

Collapse is a horror. Generally an enema with a little whisky and turpentine, given with a long tube, will do good. Hypodermatic strychnia, brisk rubbing of arms and legs and back with mustard is to be adopted. It is always necessary to procure an action from the pylorus downward. If this is not done there will soon be black vomit. A deft administration of olive oil—1 to 3 ounces—is a life saver. Collapse is usually caused by an influence equivalent to surgical shock, and the organs through which the shock comes are in order of frequency—the stomach, from excess of, or because of faulty, food; the skin, from chilling by getting up or getting uncovered; the brain, from hearing bad or unwelcome news. To avoid collapse it is needful to prevent any shock to the organs mentioned. Whatever the origin of the collapse, the treatment is the same, but in case of mental disturbance some abusive or consoling talk, as the case requires, must be indulged in also. More people have died in consequence of too early or impru-

Cause and prevention of collapse.

dent feeding than is generally supposed. I have saved a life by insisting on having a window shut down to prevent the entrance of "the lovely breeze." Free ventilation has caused the death of many; so has the sleepy nurse who let the rolling patient get naked in the chilly hours of the early morning; so has the gossiping neighbor who consoled the convalescent by telling him of the death of a friend or of the outbreak of fever in the town to which the patient's family has fled. There is another *source* of collapse. During early convalescence there is an excessive venereal desire, and under such circumstances conscience is much dulled or dead. It is necessary to warn the partner who is not sick or arrange that man and wife shall not be left alone until convalescence is complete. Thus nurses of the opposite sex are to be doubted and tabooed, if possible.

I am confident that collapse, whatever its apparent cause, is generally accompanied with an obstruction in the small intestine and oftener in the upper part. I would like to say that the shock caused the obstruction. Sometimes it is food—then high up; sometimes it is an intussusception—then lower down; sometimes it is due to a contracted colon, but if the patient could have been permitted to lie in quiet there might have been continued peristalsis. There are some who dispute my *mechanical* theories and the effects of mental conditions.

SECONDARY FEVER

The secondary fever (that of after five days) is a ptomaine poisoning and needs some modifications of the routine. Give antipyretics and high clysters for effect and increase the food. Ice to the head and rubbed down the spine, every half hour rolling the patient from side to side, will do good. Alcohol will do much good at this stage; the patient's choice is the form to use; brandy is the worst form, as it produces hiccough. Dry catawba has served me well. Gin is the best form, as it may assist the kidneys. I have never seen any benefit to follow champagne; ginger ale is better.

Continue the turpentine if the albumen compels it. I think guaiacol rubbed into the skin of the abdomen would be beneficial, but I never had a chance to try it; if put in the stomach, it is liable to cause nausea and eructations.

Chronic vomiting after four or five days may be relieved by cocaine or one-tenth grain doses of calomel with 1 grain soda bicarbonate frequently repeated. One-twelfth grain

Cause and prevention of collapse.

Ptomaines.

Stimulants.

Turpentine.

Opium increases albumen in urine.

doses of morphia hypodermically do a lot of good; watch the urine, for opium increases the albumen or the chances of it. Small blisters over the stomach do good service. Sometimes bismuth serves a good purpose; peppermint and soda have served well, but it is necessary to compel a through and through action of the bowels.

Avoid milk;
use starches.

For five days give no food but thin starches. Milk kills, as does every sort of food that requires stomach digestion. Limewater alone sometimes gives comfort to the stomach, but mixed with milk it often causes the milk to stay in the stomach to become curds in the half-rotten duodenum. Patent and predigested foods are all right in the ptomaine fever and recuperating stages, but hurtful for first four or five days; so with opium and alcohol.

At Flomaton, last summer, over eighty patients were treated with catharsis, tincture aconite, and Warburg pills. They were fed *ad libitum* on ice cream. Over a hundred gallons of ice cream were used. There were four deaths among the number treated.

There are other unique and unusual forms of treatment which I could describe, but as I began to tell how to care for *worst* cases I will omit them for the present.

Moral therapy.

The physician should remember always that the senses of the yellow fever patient are as acute as those of a puerperal fever patient and that all necessary subterfuges must appear to be absolute truth. I know of many deaths due to actual truth—brain shock and collapse following. There is no febrile disease in which physic and the mind play such prominent rôles. A constipated patient or one who has a dreadful fear of the fever will, as a rule, not recover.

THE PHYSICIAN'S DUTY TO PATIENTS.

Be confident
and cheerful.

Primarily it is a physician's duty to be (or appear to be) frank, nonchalant, observant, cheerful, confident, hopeful, and positive; he must convince the patient by word or manner that he for one among the numerous sick is *not* suffering with the "prevailing" fever and is not *very* sick. Except in disputed cases, a half dozen questions will elicit all the information needful for detailed action for next twenty-four hours. As patients later in the disease are all-embracing in acuteness of senses, it is necessary to be frank (not truthful) and to remember and adhere to whatever has been said before. Many a life has been lost by ill-advised sympathy, too much nursing and attention, too frequent dosing, and senseless gossip.

NURSES AND THEIR FUNCTIONS.

The more ignorant, if obedient, the nurses the better. All the professional nurses I have seen are at odds with the doctor and continually strive to convince the patient that when all fails *he* will bring order out of chaos and *presto* the patient will be cured. The nurse should have only sense enough to obey orders. Dumb nurses would be ideal in all critical or extra critical cases. The doctor should know how to direct the nurse as to his duties and to emergencies and crises and should be careful so that no disputes arise. The sick person must depend on nurse as well as doctor. I know of too many preventable, but not prevented, deaths due to strife between physician and nurse; unfortunately in some instances the doctor was to blame in being careless in giving directions. I know of some cases sacrificed to the zeal of a nurse who "knew more than all the doctors."

Nurses to obey orders.

FIRST AID TO SUSPICIOUS CASES.

In the Brownsville epidemic I was compelled by the geography of the country to include within the cordon a small region inhabited by nonimmunes. If I had acted in accordance with the law of Texas then in force, I would have exposed many more people and had an area to care for nearly as big as Rhode Island. To protect the people outside the infected town and inside of the guard line I supplied my guards and patrols with the medicines then in use, i. e., compound cathartic pills, mustard, and quinine pills, and gave directions for their use. Nearly a hundred cases were treated by the guards, in the country, without a death. Since then I have advised interested persons to provide the pills, mustard, and acetanilid in advance. If I were to outfit a guard line now I would furnish compound cathartic pills, compound acetanilid tablets, and mustard, to be used while the doctor was being sent for. I have suggested to Major O'Reilley, of the Army Medical Corps, that the pills and tablets be added to the first-aid package of the troops who go into yellow fever regions, with instructions for a man to take a pill at bedtime if his bowels were not freed during the past day; to take more if he had a chill in the night, and to take a tablet if he suffered with headache. It takes time to get a physician, and I feel confident that if men are given a little instruction and the few necessary remedies there will be less suffering

and perhaps less mortality. It is well known to Southern physicians that a dose of compound cathartic pills will often stop a malarial attack, particularly in negroes, and it is believed that the use of the coal tar derivatives has lessened the necessity for cinchona in the treatment of malarial diseases.

I have tried to tell how to treat the yellow fever with a limited number of remedies. Any person who will carefully follow directions will succeed in keeping the death rate at about 4 per cent, and counting accidents, ages, habits, and conditions, that is enough to hope for.

THERAPEUTIC TREATMENT OF YELLOW FEVER.

By P. A. Surg. H. D. GEDDINGS.

[From Annual Report of Marine-Hospital Service, 1894.]

In discussing the therapeutic treatment of yellow fever, it is not proposed, indeed it is impossible, to here present any long array of cases, with records of temperature and pulse and detailed symptoms of each particular case. It shall be my endeavor to present nothing that has not been of real value in the hands of my colleagues or myself, and anyone taking the trouble to read this and not finding any particular line of treatment laid down will please bear in mind that this is a record, not of what might have been, but of what has been, done. The writer believes that the treatment of yellow fever, like that of other acute specific febrile diseases, should be symptomatic and directed toward meeting plain and specific indications. The symptoms may be divided, for convenience, into those (*a*) belonging to the onset of the disease and those (*b*) which arise during the course of the illness.

General consid-
eration.

TREATMENT OF INITIAL STAGE.

Under the first head may be included the chill and subsequent fever, the distressing headache and pain in the back, loins, and limbs. For the relief of these, as well as for properly initiating a systematic treatment, it is believed that the old plan of administering a hot footbath containing mustard is an eminently proper one. The bath hastens reaction from the chill, markedly relieves the headache and pains in the back and legs, promotes diaphoresis, in this way accomplishing good, and being perfectly incapable of doing any harm. The patient, being then restored to bed, should be covered warmly but not too heavily, and gradually uncovered as diaphoresis proceeds, in order that too great prostration should not ensue. Care of course

Baths.

Purgation.

should be exercised to prevent sudden chilling of the surface. As soon as the patient is made comfortable in bed the remedial treatment should be begun. At this stage this should consist of a sharp purge, preferably mercurial. I have found calomel 0.33 grams, compound powder jalap 0.66 grams, administered in capsules, most efficient. Others prefer the compound cathartic pills (U. S. P.), of which one, two, or three may be administered, according to the age and general condition of the patient. Should either of these remedies fail to move the bowels freely within six or eight hours it may be followed by a moderate dose of castor oil, a seidlitz powder, or a bottle of citrate of magnesia.

TREATMENT OF FEBRILE AND NERVOUS CONDITIONS.

Use of coal-tar products.

Closely following the first purgative should be administered one of the coal-tar febrifuges, phenacetin 0.50 grams, or antipyrin or antifebrin 0.66 grams, either of which may with advantage be combined with 0.12 grams to 0.18 grams of citrate of caffeine. It will be well to discuss here the effect of the coal-tar series of febrifuges in yellow fever. Possessing as they do analgesic properties of the highest order, being second in this respect only to preparations of opium, in addition to their well-known power of reducing temperatures, they fill a most important place in the treatment of yellow fever. By their use in moderate doses at the inception of the attack we relieve headache and the racking pain in back and limbs, diminish restlessness, and reduce temperature within twelve hours to a point, not normal, but considerably below that at which it stood when reaction from the chill had fully taken place. Indeed, it has seemed to me that the action of the first dose of the antipyretic furnished, in some sort, an index of the course of the particular case under observation. Given a case in which after the administration of the antipyretic the patient passes into an easy sleep and wakes with diminished headache and other pains, a moist skin, and a reduced temperature, I feel encouraged to hope, though I do not say that the case will be mild or of moderate severity and will end in recovery. Given, on the contrary, a case in which the antipyretic produces but slight influence on the temperature, where restlessness is not diminished or controlled, where pain persists, and the skin, though moist, has a burning, pungent feeling, I fear the worst and expect trouble to the very end. Repeated doses of the antipyretic are not needed, or indeed indicated. It is my belief that one, two,

or at most three, doses in the first twenty-four hours of the disease will accomplish all that is to be gained from this series of remedies. Administered later in the disease, they exercise too depressing an effect on a heart already weakened as a consequence of a toxæmia more or less profound.

TREATMENT OF GASTRIC SYMPTOMS.

The gastric irritability, which is often extreme at the onset of an attack of yellow fever, may be controlled by sinapisms to the epigastrium, abstention from fluids, and frequent ingestion of small pieces of ice, which not only allay thirst, but also tend in themselves to relieve nausea. Should nausea or vomiting persist, the administration of cocaine hydrochlorate, in doses of 0.015 gram to 0.030 gram every hour or two, will often act almost magically. Small quantities of carbonated beverages, as vichy, seltzer, or appollinaris water, ginger ale, or very dry champagne, administered ice cold, will often prove of service. Creosote has also been highly recommended, and also a mixture containing hydrocyanic acid and morphia. Considerable relief is also derived from the application to the epigastrium of a liniment composed of olive oil and menthol.

Cocaine.

Carbonated
beverages.

IMPORTANCE OF RENAL SYMPTOMS.

On the afternoon of the second or morning of the third day the presence of albumen in the urine may be noted, unless the case be of the most ephemeral mildness. I believe that no case of yellow fever can occur without presenting albuminuria at some time, though that time be limited to a few hours, perhaps. It is argued by some that as cases do occur presenting a quantity only recognizable by chemical tests of great delicacy, it is possible that some occur without any. On the other hand, it is argued that a disease so terrible when severe must give some sign, even when very mild. The quantity present on first detection, and its increase or diminution from day to day, form, perhaps, a fairly good guide to prognosis. If it appears, increases gradually, and then begins to diminish, prognosis is good. If, on the contrary, it appears at first in large amount, persists or increases abruptly, trouble may be anticipated.

Albuminuria.

Significance of

"BLACK VOMIT."

The two gravest symptoms that can arise during the course of a case of yellow fever are undoubtedly black

Causes.

vomit and suppression of urine. Black vomit is caused by rupture of walls of capillaries or venous and arterial radicles, and the discharge of blood into the cavity of the stomach, where, coming into contact with hyperacid gastric juice, it becomes altered into small masses of brownish-black color, somewhat resembling coffee grounds in gross appearance. Its advent may also indicate a general hemorrhagic diathesis, which may be manifested by hemorrhages from the nose, gums, fauces, rectum, or by extravasations into the connective tissue of the scrotum. The abrupt appearance of black vomit in large quantities without warn-

Characteristics of.

ing is unusual. Careful search will often show minute brown or black particles floating in clear fluid, and presenting the appearance described by some authors as "bee's or butterfly wings." It is not uncommon, however, that patients just before death should vomit a large quantity of black vomit, and that after death the stomach should be found to contain several quarts of the fluid. It would seem probable that in these cases the hemorrhage which produces it was more of an active hemorrhage than a capillary oozing, and that death comes quickly as the result of shock.

TREATMENT OF "BLACK VOMIT."**Treatment.**

How shall we best treat the condition resulting in black vomit? The problem being both to arrest vomiting and to treat the condition giving rise to it, it follows that treatment should be directed toward the general hemorrhagic diathesis. Probably the most efficient remedy is found in

Perchloride of iron.

the tincture of the perchloride of iron. That should be given in large doses, 1 to 2 c. c. every hour or two, or, if vomiting is frequent, after each act of emesis. Counter irritation to the epigastrium, the administration of stimulants, preferably champagne or good brandy administered

Ice.

in carbonated water and given cold, swallowing of ice, and

Cocaine.

administration of cocaine, make up about the sum of our remedial agents. While enough has been said to show that black vomit is a most serious symptom, it does not follow that every patient who vomits black matter will necessarily die. A fair proportion of cases recover after the symptom has manifested itself. Still, the ejection of black vomit makes a most profound mental impression on a patient, and for this reason has often hastened a fatal termination in a case which up to the appearance of this accident had done well.

TREATMENT OF RENAL SYMPTOMS.

Of far graver importance to my mind is the train of symptoms which leads to uræmia, and which are announced by partial or complete suppression of urine. I believe this to be the gravest accident that can happen in the course of yellow fever. The amount and character of the urinary secretion should be a matter of frequent inquiry in every case, grave or mild, from the inception to convalescence. A sudden and irregular increase in the amount of albumen should put us on our guard against possible urinary suppression, and prompt treatment should be instituted and maintained. Counterirritation over the region of the kidneys with turpentine or mustard, dry cups, the application of hot-water bags, all should be tried. A *tisane* of water-melon seeds has long enjoyed the reputation of being almost a specific among the Creole population of New Orleans, and I can bear personal testimony to its efficacy alone or given in combination with spirits of nitrous ether. Of almost equal reputation is a *tisane* of orange leaves, preferably of the bitter variety, given in large quantities and frequently. A remedy much used in Brunswick in 1893, and vaunted as almost specific by those very successful in the management of the disease, was spirits of turpentine, which was sometimes given in heroic quantity, as much as a teaspoonful at a dose and repeated. I can not speak of the remedy from personal experience, but the results claimed for it warrant its more extended use.

Counterirritation.

Tisane of orange leaves or watermelon seed.

TREATMENT OF BOWEL CONDITIONS.

A point in the treatment of yellow fever, with the importance of which I am much impressed, is the frequent washing out of the lower bowel with enemata of warm water and soap. Constipation is the rule in yellow fever, and no one who has noted the exceedingly fetid, almost putrid, character of the stools of a yellow-fever convalescent can fail to see the wisdom of removing the chances of septic absorption by frequent washing away of this fermenting mass. Pass a well-oiled rectal tube as far up into the bowel as possible, and with a fountain syringe elevated not more than a foot or two force slowly 2 or 3 pints of warm, soapy water into the bowel. The whole operation should be performed with the patient upon a bedpan, not seated upon a vessel or close stool. The effect upon the temperature and general condition of the patient is most marked.

Value of enemata.

USE OF ANTIMALARIAL REMEDIES.

As to the use of quinia or allied preparations in yellow fever, I concur in the generally accepted verdict that they are without specific effect. But as yellow fever almost always occurs in regions where malarial diseases are also rife, and as the interoccurrence of a malarial paroxysm is one of the most disagreeable incidents that can mar the course of a case of yellow fever, I consider it good practice in such regions to administer 2 to 3 grams of quinine or cinchonidia in the first twenty-four hours, exhibiting the drug per rectum if the stomach is irritable.

Quinine
Cinchonidia.

DIETETIC MANAGEMENT.

A most important point in the management of yellow fever is the diet. Many a patient, his crisis past and the borders of convalescence reached, has been hurried into an untimely grave by the misplaced kindness of an apparently simple meal. The yellow fever patient should never be starved; on the contrary, he should be well nourished, but the most scrupulous care should be exercised in the selection and administration of his diet. "A little and that often" should be the rule. For the first few days milk with limewater given cold, then animal broths, concentrated but free of fat, should be the regimen. The fever being reduced, soft-boiled eggs, milk toast, and small bits of the white meat of chicken and tenderest steak may be permitted. Probably at least ten days or two weeks should elapse before the convalescent, by the easiest stages, should be permitted to resume ordinary diet.

HYGIENE OF PERSONS LIVING WITHIN AN AREA OF YELLOW FEVER INFECTION.

By Surg. H. R. CARTER.

As I understand the problem the persons with whom we are concerned, living within a radius of yellow fever infection must more or less at intervals or continuously be exposed to yellow fever infection. The measure of no direct communication with infected points will then not be considered, although I think it will frequently be possible to substitute indirect communication for direct.

NOT ALL PLACES WITHIN RADIUS ARE INFECTED.

All places within a yellow fever infected district, or town even, are not infected or are infected in unequal degrees. The infection is especially confined to the habitations of men and their environment, and is conveyed a short distance, possibly 220 meters down the wind, from an infected focus. Two hundred and twenty meters is given as the maximum distance this infection can be conveyed, it being the longest distance claimed in any instance in modern times.

Probable limits of infection as to distance.

The general consensus, however, is that this observation (Melier's) is altogether exceptional, and that less than half that distance covers the distance to which the infection is conveyed from a single focus.

AERIAL CONVEYANCE GREATER IN LARGE INFECTIONS (PROBABLY).

On the other hand, it seems probable that if the focus of infection was large, i. e., a badly infected camp or part of a town, that the aerial conveyance of infection would be decidedly farther than from a single house or ship. I know of no observations on this matter. The presence of any object—such as a hedge of trees, bushes, etc.—which breaks the wind hinders the conveyance of infection.

Foliage obstructs spread.

PROBABLE MEDIA OF SPREAD.

The microorganism, however, is unquestionably a saprophytic facultative parasite, and foci of infection can be established at a distance from the primary focus by the conveyance into suitable culture media of the microorganisms—thus, along sewers, about the dumping places of refuse, etc., and by fomites. For the same reason the infection spreads slowly along ditches and on damp and shaded grounds to a considerable distance, always to leeward. Taking all these methods of propagation, it may go far from the habitations of men and become general over all parts of a town, yet, in fact, seldom does so.

Infection
spreads in damp
and shaded spots.

A place which has become infected may remain infected for a considerable period of time, being freed from it by cold weather, ventilation, etc.

“CONCENTRATED” AND DIFFUSED INFECTION.

We will consider, then, the (1) house infection, and (2) general infection—“out of doors” infection. This is frequently called atmospheric infection, but I think the term is liable to mislead. The first is in general far the most apt to infect one exposed to it—“concentrated,” “virulent,” is usually said of it. The latter, with the exceptions above indicated, is usually confined to the resident part of the town, and especially to the neighborhood of infected houses.

INFECTION GREATEST NEAR THE GROUND.

The infection is heavy and hangs and spreads near the ground. It is unable to pass a close wall of any considerable height, although under the shady side of such a wall it may spread well when once started. It seems especially active at night, and certainly, out of doors, is less apt to be contracted on clear dry days. It is believed, I think, universally, to be taken into the human system by inhalation, although other avenues of entrance (besides the respiratory tract) are, since the observations of Sanarelli, accused by pathologists—rather from analogy, however, than from clinical observations.

Activity at
night.

RATE OF PROPAGATION OF INFECTION AND EFFECT OF WEATHER.

Dust as a prop-
agator.

The rate of propagation of outdoor infection is increased in cities in dusty weather, apparently being conveyed with the dust. It is temporarily lessened after full rains, to increase more rapidly afterwards. Strong, steady winds in clear weather lessen the infection.

MEASURES OF PREVENTION.

With this brief résumé of well-known facts we can proceed. The measures seem naturally to divide themselves into—

(1) Selection and hygiene of the living place; (*a*) to prevent exposure to infection of its residents; (*b*) to prevent its becoming infected should fever develop among them.

(2) Guarding communication between known foci of infection.

(3) Personal hygiene to prevent the individual from developing yellow fever. Personal hygiene.

(4) Measures to control (limit) infection when introduced in the living place—house, town, camp.

I. SELECTION AND HYGIENE OF RESIDENCE.

As far as the choice of a living place is possible it must be chosen, itself noninfected, as far from any known focus of infection, or residence portion of the town liable to be or become such a focus, as possible. It should, if sufficient distance be unattainable, be to the windward (prevailing wind) of such portion of the town or separated from it by trees, etc. All this is to prevent exposure to infection.

It should be on high, well drained ground, as, if infected, the outdoor infection will be less. As much exposed to wind as possible and not so shady as to be damp—better too much sun than too much shade. I can not find that moderate elevation makes any difference to the house infection of yellow fever. Dryness, sun, and ventilation do. Elevated sites preferable.

WATER SUPPLY.

Parenthetically it may be well to note that there is no reason to believe that yellow fever as usually propagated in this country is water-borne—the fresh-water tanks of infected vessels have never been and are not now emptied at our maritime quarantines. Nor am I aware of any facts which accuse this method of propagation in the tropics, and profoundly disbelieve that this is a usual method of propagation. Probably not a waterborne disease.

Yet from the analogies of growth of the bacillus icteroides of Sanarelli, most prominent now as a causative agent, with the colon group, it would seem well to secure a water supply free from possible contamination with this bacillus.

The same theoretical reasons exist to suspect food as a means of conveying the fever. There is less evidence of its innocence.

PREPARATION OF GROUNDS.

D r a i n i n g
grounds. This place chosen for residence should be ditched so as to keep dry. Tile draining would be infinitely preferable, as the bottom of a ditch is shaded, and therefore damp. It should be kept very clean, and free from vegetable as well as animal litter, decaying leaves and wood, especially sawdust, seeming to be as bad as animal refuse. Brush, etc., must be cut out to let the wind freely through, and not too much shade be allowed.

CHARACTER OF HOUSES.

Construction of
wood. The houses should be preferably of wood, high above the ground, with free circulation of air under them; very open and light—as little shaded by trees as possible, depending rather on verandas and awnings for comfort. No dark closets—all to have windows, no understairs closets. Light and wind must go everywhere.

MOLD FAVORS THE DEVELOPMENT.

The writer observed (Annual Report of 1891) “the conditions which favor mold favor the spread of yellow fever on wooden ships.” He has seen no reason to change his views.

Value of sun
and wind.

Dryness of ground and of buildings, with free exposure to wind and as much to the sun as is allowable in a bad climate, with absolute cleanliness, are the conditions aimed at. This is to prevent or limit the extension of infection in this living place (house, town, or camp) if introduced, and if carried out we may hope to have no infection of the locality, even if cases of yellow fever are brought or developed therein.

If it be a camp, the people living in tents, it will almost always be practicable to prevent infection.

II. GUARDING COMMUNICATION WITH KNOWN INFECTED FOCI.

COMMUNICATION PREFERABLY BY IMMUNES.

Where communication with known infected foci can not be carried on by immunes, if it is practicable to make it indirect, this should be done. The direct intercommunication by immunes (or by nonimmunes not sleeping in the place which we wish to preserve from infection) is practically safe, if any reasonable supervision be given to it.

Where direct communication with towns where such foci exist must be practically unlimited, still the safeguard of "daylight communication" may be applicable.

DAYLIGHT COMMUNICATION.

Under this, nonimmunes are all allowed to go into the infected town during the day, pledged not to enter any residence, and leaving town before evening. The hours in the town are usually from 9 or 10 a. m. to 3 or 4 p. m., and what part of the efficiency of this safeguard is due to non-exposure to infection by keeping away from the residence part of the town, what part to the short time spent in it, and what part to the fact of this time being entirely during the bright part of the day is difficult to determine; nor is it necessary. The method is not safe, but it is little dangerous, and if carried out in absolute good faith, and only on clear days, would be safe enough for all practical purposes—certainly unless the town were very generally infected.

Allowable on
clear days at
specified hours.

DAYLIGHT COMMUNICATION IN CLEAR WEATHER ONLY.

The writer knows of two instances of persons who had thus entered and left an infected town a number of times on clear days with impunity, and who, after visiting it on damp, cloudy (muggy) days, developed fever. It would seem, then, that clear weather may be an added protection against outdoor infection. Theoretically it would be.

FOMITES.

The risk of conveying infection by fomites to our people depends on (a) exposure of articles to infection and (b) capacity to retain infection. For the first, articles stowed away and handled in the nonresident portion (wholesale district) of the town are little liable to be exposed to infection. Of course, we may and do have infected warehouses in this district.

Media of infection.

The capacity of an article to retain infection depends on the nature of its exposed surfaces. If these be hard, smooth, and nonabsorbent the article will be little likely to convey infection. Household goods are naturally most exposed to infection, and of these goods used bedding, upholstered furniture, and clothing are the most certain to retain it. They should be burned.

Household goods.

PASSING THROUGH AN INFECTED TOWN.

There is, of course, no special reason why articles of freight merely passing through an infected town should become infected in transit. The same applies to such articles stowed in noninfected warehouses.

III. MEASURES OF PERSONAL HYGIENE TO BE ADOPTED BY THE INDIVIDUAL TO PREVENT HIS DEVELOPING FEVER.

THE PERSON'S SURROUNDINGS.

Communica-
tion between
houses should be
limited.

(1) There are the obvious precautions that he should not expose himself to infection when practicable to avoid it, i. e., should not enter houses unnecessarily; should not go out of his own (uninfected) quarters at night; should not receive or come in contact with any fabrics or household goods about the exposure of which to infection there is doubt.

These precautions are of decided value, and by them and similar ones a man may live, and many do live, in towns in which yellow fever is endemic for a long time, and escape infection.

PERSONAL SUSCEPTIBILITY.

(2) Are there personal conditions which affect the susceptibility of an individual to yellow fever; and if so, to what extent are they under our control?

Here I must premise that on not a few points the opinions generally current, even among those best entitled to speak authoritatively on this matter, are founded on insufficient data, and are thus shrewd conjectures, based on general experience rather than scientific deduction from analyzed observations. Still, a consensus of conclusion, independently arrived at by men of wide experience and under varied conditions of observation, has a strong antecedent probability of being correct. It is therefore not intended to limit the recommendations on this subject to what is proven of value. A difference will be made, however, between such things as stand on good evidence and such as are merely current belief, confessedly an inconclusive data.

THE PERSON HIMSELF.

There are certain personal factors affecting susceptibility which we can not influence, and yet of which we may avail ourselves advantageously, as—

The negro
race.

(a) The lessened susceptibility of the negro race.

(b) The lessened susceptibility of those living for years ^{Residence gives immunity.} (better for generations) under the conditions which obtain in the tropics.

ATAVISM.

It is this probably that gives the "relative immunity" of those suffering from "tropical anæmia" on which certain French writers insist. What influence ancestral amaryllization has is undetermined—probably considerable.

PHYSIQUE.

Thin, spare, vigorous men are less liable to develop the disease, and bear it well; the plethoric and full-blooded ^{Spare men withstand disease well.} are more liable to develop it and have it severely. But this is nearly the same as saying that those suited by habit of body to the conditions of tropical life have a lessened susceptibility.

PHYSICAL STATUS AT TIME EXPOSED.

To inquire into the conditions which affect susceptibility which we can influence we must note that there are many observations to show that the time and probably the fact of the development of yellow fever is determined by causes which affect the physical condition of the individual, such causes acting at the time or just preceding the development of the fever.

RESEMBLANCE TO MALARIA.

In this respect the disease resembles malarial fever, an attack of which will develop under certain conditions—mainly of failure of elimination of shock or of depression—which otherwise had failed of development altogether.

These causes in the main are those which diminish excretion and which depress. In the opinion of the writer (the contrary is held by most authorities) the former is the most important factor. Now, these causes we can influence.

MOST POTENT AUXILIARIES TO AN INFECTION.

To enumerate them about in the order in which they occur in frequency just before the initial attack:

(1) A sudden chilling of the surface, especially if wet ^{Chill.} with perspiration. This is common in the experience of every one.

(2) Excessive exposure to the direct rays of the sun. ^{Exposure to sun.}

The writer has seen but few cases of this. In all the sun exposure (exhaustion) was associated with a very dry skin.

It is much insisted on by Beranger-Feraud and some other French writers.

Fatigue.

(3) Excessive physical fatigue (in my experience complicated with (1) and (4)).

(4) Anxiety and mental distress generally, especially fear of the disease.

RELATIVE VALUE OF CAUSATIVE INFLUENCES.

To estimate the effect, and especially the comparative effect, of these things (many of them frequently acting coincidentally) in determining the development of yellow fever is impossible, but that they do influence it is generally credited. There is so frequently a history of sudden chilling (as by a rain squall) of the surface, preceding by a short time the development of the fever, that it seems impossible to ignore its causative influence. The same is true to a less extent of exposure to the direct rays of the sun.

The influence of the others rests on much slighter evidence, mainly opinion, and to what extent these opinions are copied by one writer from another, and to what extent arrived at independently, the writer has no means of determining. He has never had any reason to accuse them as etiological factors.

DIARRHEA AND CONSTIPATION.

Diarrhea, common enough among those exposed to yellow fever, and certainly debilitating, has not seemed to induce (i. e., precede) an attack. The constipation nearly always associated with the advent of the fever will generally be found to have preceded it some days, and while it may be a prodrome, the writer is of the opinion (on insufficient grounds, he admits) that it has an etiological influence.

Febrile complication.

DIET AS AN ETIOLOGICAL FACTOR.

A meat diet is claimed, too, to increase the susceptibility to the disease, as well as to make it more severe, the claim being made that the house servants (negroes) in Martinique and Guadeloupe, who live like their masters, took the fever more readily and had it more severely than the plantation hands, and, indeed, showed nearly the same susceptibility as the whites. The evidence seems insufficient, and certainly is not true to the extent here asserted of negroes in the United States. An over full meat diet, from throwing extra strain on the liver and eliminating organs, would naturally make the attack more severe, and may from the same cause increase susceptibility.

Meat diet.

ALCOHOLICS.

The same is true of alcoholics, and it is well known that having used alcohol to excess is an element of decided danger to one who has the fever. I know of no evidence that the use of alcohol per se increases susceptibility. The habits of an alcoholic would increase exposure.

WATER AND FRUITS.

The free use of water and a diet of juicy fruits and fresh vegetables, increasing elimination by skin, kidneys, and bowels, should put a man in a better condition to go through the disease and probably lessen his chance of developing it.*

WHAT TO AVOID.

To state these conditions and to allege that they favor the development of the disease is to inculcate to their avoidance. The individual must avoid excessive fatigue and undue exposure to the sun.

CLOTHING.

The use of a sufficient head covering is useful here, and nothing is so good as the thick pith white helmet. The white straw hat or duck cap with a handkerchief in it is good, infinitely better than the dark felt hat, or even than the hat or cap without the handkerchief, but nothing that I have seen takes the place with me of the pith helmet.

Head covering

To avoid chilling the surface, flannel should be worn.

WOOLEN UNDERWEAR.

Indeed, in a tropical climate chilling is far more to be avoided than getting too hot. There is no need for two shirts, but let the one worn be flannel. A very thin shirt of other material may be worn under it if the skin be tender. The same is true of the leg covering, either flannel drawers or thin drawers and flannel trousers—the former preferably. In the opinion of the writer, from considerable personal experience, this rig is also most comfortable. The flannel shirt is more important than the drawers, as the body requires more protection than the legs. He should take

Shirts.

Drawers.

*The writer is inclined to believe that a diet with a little meat lessens susceptibility to infection, but the data on which this rests are insufficient to justify any save a "somewhat probable" opinion. A meat diet in the tropics is not wholesome, however.

Coats.

proper precaution—waterproof blanket or coat—to keep dry. Should he go out at night, he should keep warm—take his coat. He should not cool off suddenly when wet with perspiration. He should not drink alcoholics, save when necessary to ward off a chill or avert serious fatigue. There is little risk of eating too much meat; there is little taste for it in the tropics, and it is extremely tough. He must not allow himself to become constipated. This probably is next in importance to the wearing of flannel and proper head gear.

MENTAL STATUS.

Occupation of
mind during epi-
demic.

Keeping the mind occupied and making light of the fever is probably the best way to meet the fourth indication, but the evidence that susceptibility is increased by fear of the disease is very slight (or nil).

Danger to life after taking fever is markedly increased by it. The most that can be hoped from all these measures is lessened susceptibility, and a considerable proportion of men will develop fever if sufficiently exposed to infection, in spite of them—a less proportion, however, than if no precautions were adopted. Their value is probably not great.

SANARELLI'S IMMUNIZATION.

Its value.

The use of the serum of Sanarelli as an immunizing agent is subjudice. From the evidence he has seen, the writer would recommend its use. The use of other immunizing serums is so innocent, causing decidedly less inconvenience than vaccination, that even without pinning one's faith to its efficiency it would seem unwise not to avail ourselves of what is probably a valuable prophylactic, and if so, really the only one worth considering.

IV. MEASURES TO CONTROL INFECTION WHEN INTRODUCED INTO THE LIVING PLACE.

PRIMARY CASES.

Early discov-
ery.

Should fever develop among the people the measures used for "first cases in town" are applicable to those that occur in houses, and, should only a moderate number develop, ought to succeed in averting infection of the locality. Indeed, a very considerable number will not infect the place if properly handled. The principles are well known and set forth at length in another paper. Early discovery of cases, isolation of the same, and immediate disinfection of

the premises of the patient are the tripod on which these measures will rest.

TREATMENT "AT HOME" POSSIBLE, BUT NOT ADVISABLE.

Should removal of the patient be impracticable, rigid asepsis of his environment will frequently, and, under the conditions of life above described, generally, allow us to treat him at home without establishing a focus of infection; but it is less satisfactory and involves greater risk.

There should be no question of "suspects," the handling of whom is by far the most difficult question of house quarantine, as the cases among the people we are considering should be discovered early—within twelve or at most twenty-four hours—moved away, and the place disinfected before it is capable of conveying infection to the other inmates of the house. Prompt isolation and disinfection.

REMOVE ALL NON-IMMUNES WHEN POSSIBLE.

If the patient is treated in his house, it is very advisable, I do not say necessary, to move the other nonimmune inmates out of the house. Should the people be in tents the well-known methods of the detention camp apply. Detention camp. These are well known, and if the condition be such that they can be used will prevent almost with certainty any infection.

The problem here is simpler still, and the same principles apply, only we always move the patient. There are no "suspects." I think we can always prevent the infection of a well-situated, well-handled camp. Should we fail the camp is to be moved, disinfecting by aeration or otherwise all articles suspected of being infected. "Suspects."

HOSPITAL TO BE "CONSIDERED" AN INFECTED PLACE, BUT KEPT FREE IF POSSIBLE.

The hospital, regular or improvised, at which these people are treated must be treated as an infected place, but we can very generally prevent its infection if we have control of it from the beginning.

HYGIENE OF PERSONS LIVING WITHIN AN AREA OF YELLOW FEVER INFECTION.

By P. A. Surg. EUGENE WASDIN.

The rules of hygiene necessary to be observed by one exposed to the infection of yellow fever, either in a country to which it is indigenous or in one accidentally infected, are those which apply to the individual and to his environment.

AIR-BORNE DISEASE.

Yellow fever is essentially an air-borne infection, the entrance of which into the system has been supposed to be by way of the alimentary canal; the upper intestine serving the purposes of incubation of the causative germ; the absorption of its poison giving rise to the disease.

MODE OF INFECTION.

More recently it has been advanced that probably the germ of yellow fever enters the general circulation through the respiratory organs in some obscure manner, and incubating in the blood directly poisons this life-giving stream. However, this may prove to be, the present opinion is that one has not to contend with an organism or germ which may be taken into the body with food or drink, but with an almost inexplicable poison, so insidious in its approach and entrance that no trace is left behind. Individual hygiene for one exposed, therefore, is scarcely as important as the hygiene of his surroundings, for if these become infected there are no known measures for his protection that are in the least specific.

Hygiene of
surroundings.

AVOIDANCE OF KNOWN INFECTION AND RULES OF PERSONAL CLEANLINESS.

The avoidance of localities and material known to be immediately infected is advisable. The observance of the

rules for personal cleanliness is imperative. All undue fatigue should be avoided, and the question of suitable clothing carefully considered, for it would be equally wrong to burden oneself with clothing suited to colder climates as to too suddenly adopt the scantier raiment of a native. Good, warm underwear would prove grateful and prevent too rapid variations of surface temperature. Exposure to the heat of the sun should be as limited as practicable until one becomes accustomed to its influence. Exposure at night is known to be injudicious and should be avoided.

Clothing.

Night air to be avoided.

DIET.

While we do not know that this infection takes place by way of the intestinal canal, it has become the custom in those localities in which it is endemic to advise all who are first exposed to exercise extreme care in keeping the bowels in good order. It is very necessary that intestinal hygiene be carefully observed in all hot climates, and there is no doubt that the intestines present, in yellow fever, conditions which seem to connect them with the presence of the morbid agent. Therefore, the greatest regularity in taking meals should be observed; the taking of well prepared substantial food, such as one has been accustomed to, and in such quantities that there may result no incomplete digestion is advised. A careful discrimination is necessary in partaking of strangely-prepared dishes and of unusual varieties of fruit.

Intestinal hygiene.

DRINK.

As to drink, the use of boiled water, so much advised, can scarcely do more than prevent the introduction of agents capable of causing catarrh of the bowels, or fevers other than yellow fever. Still its use is advisable. Alcoholic beverages to one unused to them are harmful; to those habituated their use in moderation seems necessary in order to avoid that catarrhal condition attendant upon their too sudden withdrawal. Especially should unknown beverages be avoided.

Boiled water—alcohol.

PROPHYLACTIC MEDICATION.

The use of internal medication to ward off this disease is, I believe, useless, nor is it probable that sachets of camphor, or any other deodorant, do more than annoy one. Attention to these simple rules of living and early consultation with a physician if needed will serve to maintain the alimentary canal and skin in normal condition, thus

Organic disease should cause extra precaution.

directly enabling the system to overcome the morbid agent, or at any rate maintaining it in that condition most favorable to resist the infection should it occur. Nobody is prepared for this better than a normal, healthy one, and it is needless to add that it is wrong to expose oneself to this infection if there preexists any organic disease, for the chances of recovery are in direct proportion to the integrity of the great organs of life—the heart, liver, and kidneys. Any incapacity in these organs must contribute to the mortality in this disease, but scarcely adds to the probability of infection.

ENVIRONMENT.

Moisture, heat, and filth.

The hygiene of environment is the more important. While experience has shown that once introduced into a locality yellow fever may act without marked characteristics, yet the presence of dampness, heat, and filth seems to result always in a form of the disease more malignant than when these conditions do not exist. Therefore the selection of habitat is important.

DRYNESS AND ELEVATION OF APARTMENTS.

Good drainage.

One should select a dry, well-drained abode, to which sunlight has free access, and which can be thoroughly ventilated. There should be no stagnation of drainage or sewage, nor dampness to result in the growth of moulds; and to this end quarters elevated from the ground present attractions. Although it is not known that animal or vegetable débris influences yellow fever infection, yet there is no doubt that their presence induces a lowered vitality, which makes one more liable to the infection.

SANITARY POLICING OF ABODES.

Disinfectants.

Therefore, thorough policing of one's habitation must be rigorously demanded, also the use of disinfectants to insure the destruction of offensive material. Finally, it may be noticed that there can be said, at this time, nothing which is specific. There is nothing which one may do directly to prevent infection after exposure. Many will escape, while others will succumb. A spirit of bravado or nonchalance is equally out of place with one of abject alarm. One should live in such a way that the precautions suggested above may be intelligently exercised, and he will have done all that a sound mind within a sound body can do.

HYGIENIC MEASURES TO BE ADOPTED BY PERSONS LIVING WITHIN AN AREA OF YELLOW FEVER IN- FECTION.

By P. A. Surg. H. D. GEDDINGS.

PROCESS OF INFECTION.

While yellow fever is a communicable disease, it is not contagious in the ordinary acceptation of the term, but is spread by the infection of places and articles of bedding, clothing, and furniture. This is a process requiring several days (extrinsic infection), and during this period the yellow-fever patient is as harmless as one suffering from a surgical complaint.

AVOIDANCE OF INFECTED PREMISES.

To my mind the lesson is obvious, viz, that the non-immune should avoid domiciles where yellow fever has prevailed or contact with articles or fabrics exposed during the course of a case of yellow fever, until disinfected by some approved method.

EPIDEMIC INFLUENCE.

While yellow fever is generally communicable only under the above conditions, it has been forced upon me that after the existence of yellow fever for some time and in considerable intensity in a locality the disease may be propagated by what, for lack of a better term, we are forced to denominate "epidemic influence." The question has puzzled me greatly, and I can offer no other explanation than that of an "intoxication," caused by the absorption or ingestion of "toxines" liberated by the yellow fever organism in the process of its growth, under favorable conditions, outside of the human body.

Toxæmia.

NIGHT INFECTION.

Experience has demonstrated that this infection seems less likely to occur during daylight than at night, consequently we can deduce that "exposure by nonimmunes to atmospheric influences at night is to be avoided."

INFLUENCES TO BE AVOIDED.

Experience has demonstrated that during the prevalence of yellow fever in epidemic form, or in an epidemic habitat, anything which causes chilling of the body with consequent internal hyperæmias or congestions, predisposes to the invasion of the disease. Therefore, wetting by rain or dew is to be avoided, also the sudden chilling of the body when sweating by exposure to drafts or cold bath, when heated by exertion or when fatigued.

SLEEPING ON GROUND.

For the same reason, sleeping on the ground without the interposition of some impermeable substance is to be avoided, not that the ground is dangerous per se, but that it produces chilling of the body.

AS TO WATER SUPPLY.

While there is no proof that yellow fever is a water-borne disease, it is suggested that as a matter of precaution all drinking water be boiled before use.

FOODS.

While articles of food, especially fruit, can not produce yellow fever themselves, it is perfectly possible that in an epidemic habitat they may serve as vehicles of infection. Therefore they should not be eaten unless sterilized by cooking, preferably by boiling.

ALCOHOLICS.

Temperance in the use of alcoholics is to be advised, for the reason that the catarrhal conditions caused by their use offer less resistance to the invasion of the specific organism.

CATHARSIS.

Experience has demonstrated that during the existence of yellow fever in epidemic form, liability to the disease is diminished by keeping the bowels open by mild cholagogue cathartics. Excessive purgation is to be avoided, as tending to impair the force of vital resistance.

CLOTHING.

To prevent chilling of the surface it is recommended to wear light woollen next to the skin in preference to cotton or linen.

The use of hot coffee in the morning before going into the open air is to be recommended.

SUGGESTIONS TO PERSONS IN CITIES INFECTED WITH YELLOW FEVER TO PREVENT AN ATTACK OF THE DISEASE.

By Sanitary Inspector W. F. BRUNNER.

DEPOPULATION.

While the only positively safe measure to prevent the spread is to exhaust the material by depopulation of the infected city, a complete depopulation is impossible.

DAYLIGHT COMMUNICATION.

In the epidemic of 1876 at Savannah, Ga., it was the habit of several hundred business men to leave the city every afternoon before sunset and spend the night at some of the small towns near by, returning next morning after sunrise to pursue their different callings. But few cases developed among such persons. This plan was suggested after the manner of rice planters and their white managers, who, while daily visiting the rice fields, obtained freedom from attacks of malarial fevers by following this custom.

CHOICE OF RESIDENCE—BEST HIGH ABOVE GROUND.

There are other persons to be found in infected towns who are unable to leave the city for the night. To this class of persons it is suggested that they occupy living and sleeping apartments as far removed from the ground floor as possible, which should be on the sunny side of the house, and which should be aired daily during the middle hours of the day, and closed during the night as much as would be consistent with comfort. Avoid in every way ^{Avoidance of} exposure to the night air. _{night air.}

In a seaport or in a town on a river persons should be prohibited from sleeping near the wharf or river front. Every epidemic has shown that yellow fever attacks more readily persons living in such localities, and the fever

assumes a more virulent form. My experience in Savannah, 1876, and Vicksburg, 1878, gave positive and practical evidence of this fact.

INTEMPERANCE DANGEROUS.

The avoidance of all intemperance should be practiced. Alcoholic stimulants are often indulged in, presumably to dull the fear of contracting the disease, but it is known that the highest mortality of yellow fever exists in those persons addicted to the free use of liquor.

DIET.

Foods should be avoided which are likely to cause irritation of any part of the alimentary tract, and as much care should be taken against the use of drugs so often recommended and used by the laity to prevent an attack of the disease. During every epidemic of yellow fever drastic cathartics are daily taken by the advice of druggist and friends. No more unwise course could be pursued. With a suspicious or doubtful water supply, boiled water should always be used for drinking purposes.

Catharsis.

Water.

LAUNDRY.

Care should be taken as to disposition of soiled clothes, as they may be taken to infected houses to be washed, and, while returned mechanically clean, may be infected.

POLICING PREMISES.

The daily removal of household wastes should be carefully looked after, and all back yards be kept scrupulously clean; great care should be taken not to use one or more of the numerous "so-called disinfectants," used so often to remove offensive odors, it being evident that to remove the cause of offensive odors is better sanitation than to stop one odor with another. Too much stress can not be placed on this suggestion. Damp basements and cellars should be dried and quicklimed at frequent intervals. Privy vaults should be frequently disinfected. The isolation of a patient suffering from an attack of yellow fever should be as complete as that of one suffering from diphtheria or scarlet fever. Care should be taken to sterilize all clothing and material in the infected room and to thoroughly disinfect the room and contents after recovery or death of the patient. It must be said that these sug-

Disinfect, not
deodorize.

Dry out damp
cellars, etc.

Sick-room hy-
giene.

gestions are applicable only to the intelligent, thinking class of a community; for all others sanitary policing by the controlling authorities is absolutely necessary.

TROOPS IN TROPICAL CLIMATES.

What has been said in the preceding remarks will apply but little to troops occupying cities and towns in Cuba. Havana, being the largest and most important city in the island, will be the point against which the main body of troops will be thrown, and, after occupation, will require a large force to garrison it. The number of the garrison should be at a minimum compatible with military safety. If possible there should be no men quartered within the city proper.

ALTITUDE AND DRYNESS ARE FACTORS IN CAMP SITES.

They should be camped on the high hills of the Vidado, lying west of the city. It may be suggested here that the wooden pavilion hospital Alphonso XIII, after disinfection, could be used as a barracks, care being taken to destroy those pavilions which have been used for the care of smallpox and yellow fever. This hospital has a capacity of 3,320 beds.

Alphonso XIII
Hospital a good
site.

CITY QUARTERS FOR TROOPS IN HAVANA

If it is necessary to quarter the men in the city, they should not be housed in any building before complete disinfection of the same, nor should they occupy any building east of that portion of the city bounded on the north by the Calle Prado.

OLD CITY IS VERY BAD.

The portion of the town proscribed is the old part of the city, and includes that part bordering on the bay. In my opinion, if it is absolutely necessary to have an armed force of men within the city, they should not be quartered in any building, but should occupy tents placed in the center promenade of the Calle Prado or Prado street. The street is the line of demarcation between the old and new sections of the city; it is about 220 feet wide and extends almost due north and south for approximately 1 mile, being intersected by what is called the Central Park. The center promenade of the street is raised about 2 feet above the carriage ways on either side, is about 70 feet wide, with

Prado a good
camp site.

two rows of trees on either side furnishing shade during the hottest part of the day without entirely excluding the sun's rays; its surface being elevated above the carriage way, it is free from dampness.

RELATIVE SAFETY ON PRADO.

There is no question as to the wisdom of quartering the men in tents pitched on this street; many Americans have lived on this street during the writer's residence of one year, and they enjoyed immunity to yellow fever to a marked extent. With the men so quartered all requisites of sanitary policing could be rigidly carried out. Great care should be taken to prevent the men from having the liberty of the city, particularly that part of it near the wharves; night leaves of absence being prohibited.

This disposition of troops naturally can not be made in reference to other cities beyond the recommendation that if possible the men be quartered outside the different cities.

CLOTHING FOR CUBA OUGHT TO BE WOOLEN.

One of the principal precautions to be taken is in the matter of clothing. Flannel, light in texture and color, is the best material. Our ration table should be carefully looked after, as the ordinary ration will not answer in Cuba.

A PRÉCIS ON HYGIENIC MEASURES TO BE TAKEN IN A TOWN INFECTED WITH YELLOW FEVER.

By Surg. H. R. CARTER.

WHEN TO ESTABLISH PROVISIONAL QUARANTINE.

In general* on the credible report of yellow fever, or suspicious fever, at a place, steps should at once be taken to prevent people and goods from that place leaving it. This should be done pending investigation, which should be immediately made, and the quarantine proclamation should announce that it is temporary and only until investigation *is* made. For this time, however, the prohibition should be absolute (save possibly for those certainly going to places incapable of infection by yellow fever, and to remain in such places). This is necessary because one case reported may mean a thoroughly infected town, and the exodus, almost certain to take place on the report that an investigation is being made, may do irreparable damage. With this had best be also included (in partial quarantine at least) such places as from communication with the quarantined place would naturally share its infection should it be infected. Thus a quarantine (temporary) of Biloxi and other coast towns had been advisable when fever was reported at Ocean Springs.

WHEN QUARANTINE IS NOT NEEDED.

(1) When the case reported is reported as an "imported case" (i. e., is believed to have contracted infection elsewhere), and is reported early.

The presumption then is that there is no focus of infection in town, and if this be true, quarantine is unnecessary.

An example is the De Villa case in New Orleans in 1889. This man contracted yellow fever in the tropics (Livingston, I believe) and developed it in New Orleans (or en route) and died in New Orleans on October 3, 1889. It was obviously not contracted in New Orleans; its presence showed no focus of infection there, and quarantine on account of this case was unjustifiable. Similarly the Gelpi case of 1897, obvi-

*I say "in general," because there are conditions in which this is inadvisable.

ously contracted in Ocean Springs, gave no sufficient reason for quarantining New Orleans, although the known communication of New Orleans with Ocean Springs, I think, did justify partial quarantine independently of the report of any case.

An example showing where this rule had led to error, however, is afforded by the Branham case of 1893, at Brunswick, Ga. This case was reported, and believed, to have contracted fever at the quarantine station and was brought to Brunswick. If this were true this sickness was no evidence of focus of infection in Brunswick, and hence no absolute quarantine was laid pending investigation; only an inspection quarantine was put on to prevent persons going by common carriers from Brunswick to infectable towns south, such as Savannah, Jesup, Jacksonville, etc. On investigation three other cases were found, and on the finding of the second case an absolute quarantine was laid. In the meantime people had driven out from Brunswick to country places near by, and indeed to some distance, and from one of them, Jesup indirectly received its infection.

What credence to give to the reported origin of a case of yellow fever reported in a town prior to a full investigation is often a serious problem; but the consequences of delaying action, should immediate action be needed, are so deplorable, that, if doubtful, a temporary quarantine should be laid.

(2) When the town is large,

There are three reasons for this exemption.

(a) The chance of a large town having much infection in it with the report of the first case is minimal, and is not possible if the health officers act in good faith.

(b) An exodus from the investigation is little apt to take place from a large town. It is certain to do so from most small towns, and the town being (proportionately) less infected, such exodus as might occur is less dangerous.

(c) The loss occasioned by the quarantining of a town is in direct ratio to its size and the length of time it is maintained; and, as the time required to make a satisfactory investigation of a large town is considerable and may vary considerably, the loss from absolute quarantine of a large town pending investigation would be very much greater than for a small one (probably about as the squares of their population).

It seems, then, that to omit the quarantine of a large town pending investigation is less dangerous and to institute quarantine more injurious than in the case of a small one, and I think in general quarantine should not be imposed on a large town pending investigation.

INVESTIGATION OF EXISTING FOCI.

Having determined on the diagnosis of the reported case or cases we should, if they be found to be yellow fever, find out—

(1) The source of infection.

(2) The amount of infection.

(3) Who has been exposed to that source or to the foci (presumably) established by the sick in town.

I. SOURCE OF INFECTION.

The determination of the first may enable us to pronounce the case an imported one, and possibly relieve the town from quarantine. It may enable us to suspect a focus of infection in an unsuspected town, as the case reported by Holloway in Louisville in 1897 led to the investigation of Ocean Springs, Miss.

Yellow fever in a resident (as in a new comer from a place where no yellow fever exists) is strong evidence of a focus of infection in town, and hence of other cases.

II. AMOUNT OF INFECTION.

At the same time, an investigation of other cases of fever in town should be made to determine their nature. A rapid examination of the mortuary reports for the past six or three weeks—a more complete examination may be made later—and such diagnosis investigated as fatal cases of yellow fever are liable to be reported under. This is especially necessary if the source of infection be unknown. Following the preliminary investigation, a careful house-to-house inspection is, for a small town, always to be instituted.

III. EXPOSURE TO INFECTION OR TO THE SICK IN TOWN.

While investigating the source of infection and determining the existence of other foci or cases in town we must find the location of all who have been exposed to infection, whether from the original source or foci of infection, and to the (possible) infection of the premises of the sick. These are the "suspects."

This is a most important and difficult inquiry and the success of the measures, if it be suppressible, depends mainly on its thoroughness.* In this connection it must be remembered that the infection of yellow fever is transmitted a little way aerially, especially down the prevailing wind, and there are instances of the measures above described proving futile because the residents of houses adjacent to the infected premises were not counted exposed and therefore kept under observation. It was partly to a careful watch of the houses to the leeward of the infected premises that the suppression of the yellow fever at Franklin, La., in 1897, was due.†

How far infection can be conveyed aerially may be a question. Mèlier's celebrated case at St. Nazaire, in 1861, I think, reported to

* The writer has on two occasions found that the laundress, to whom the soiled clothes of the patient had been sent, had not been considered in enumerating those exposed to infection. Inquiry must be made of these and all other articles leaving the house since the sickness began.

† In the town of Franklin every physical condition against controlling the fever seemed to exist, and yet it was controlled.

have contracted it at a distance of 220 meters, and the writer reported a case in 1891 where the apparent source of infection was a measured 70 fathoms distant. Still, these cases are altogether exceptional, and it is so difficult to eliminate all possible chances of infection that it may be that the apparent source of infection in both of these cases was other than the one considered by the reporter.

There is no question, however, that infection is not infrequently taken from a focus across an ordinary street, and in my experience this is about as far as it is transmitted.

CONDITIONS WHICH DETERMINE QUARANTINE.—PARTIAL QUARANTINE.

As soon as the nature and extent of the infection and the measures to prevent transmission of the disease in the town are sufficiently determined, we can determine on the measures of quarantine, if any, which should be adopted against the town.

The first question to be determined is, Does the place require quarantine, or shall that put on pending investigation be raised? (A) If the disease be certainly confined to a few houses and all who have been exposed to possible infection be known and this house or these houses and all exposed to infection be under guard and sanitary supervision—i. e., “in quarantine,” quarantine against the town may be raised.

If in doubt whether all who have been exposed to infection are under observation, it will be necessary to wait some time greater than the maximum period of incubation of the disease before doing this, and if no cases arise in the town we can lift the quarantine. Proper precautions to prevent infection from every possible focus having been observed, this, of course, is equivalent to holding the whole town under observation, “in quarantine,” and implies a careful and frequent inspection.

WHEN DISEASE OCCUPIES RESTRICTED LIMITS.

(B) Similarly, if the disease be confined to a portion of the town and this portion can be efficiently isolated from the remainder, this may be done, and this clean part of the town used as a detention camp; and after the period of incubation has passed, there being and having been no fever among the residents, they may be released from quarantine.

Since the release of these people from quarantine depends on no fever developing among them, a most careful inquiry for those of them who have been exposed to infection should be made, and these should be removed from this part of the town.

FOMITES.

Care must be taken with clothing, etc., of these people, not only to prevent them carrying possible fomites out of the quarantine, but to insure that they are not exposed to infection from fomites while

they are undergoing their detention. To require the disinfection, when they leave, of the clothing which they take with them is wrong in principle. If this stuff, or any in the house, be infected, these people are continuously exposed to infection and should not be released. If it be not infected disinfection is not needed.

By going through the premises carefully when the isolation is begun we can very generally determine if there be anything in the house which requires disinfection, and if there is it should be disinfected then, not later.

It was on this principle that in 1897 the camp grounds and Heart-ease Park were isolated from Biloxi, with which they form almost one town, and the residents given pratique after ten days. The same was done in 1893 about Waynesville, Ga., and in both cases a considerable number of people relieved from quarantine restrictions with safety.

It is thus seen how the quarantine laid against a town pending investigation will be modified both by the amount of infection and by the sanitary measures taken. The fact that it will be so modified is an added inducement to the town to take proper sanitary measures.

COMPLETE QUARANTINE.

I do not propose to discuss the methods of putting on a general quarantine against a town, as the problem varies ad infinitum. Whether a cordon forbidding all direct egress of persons, etc., be established; or whether it be limited to guards on the general lines of travel, including dirt roads; or simply to railroad and water craft, will depend, as will the degree of communication authorized, on local conditions. The first, of course, should give the most security. For a large place it is generally impracticable, owing mainly to the territory immediately surrounding a large town maintaining direct communication with it, either unlimited or surrounded by certain safeguards, as "daylight communication." This makes the extent of territory exposed to infection too large to be surrounded by a cordon. Whether this direct communication should be permitted by the health authorities depends on the risk of spread of infection outside of (and in) this "neutral territory," and must be decided on its own merits for each case. It increases this risk.

A word about "daylight communication." Briefly, this is direct communication with an infected town. Persons being allowed to visit it during the daytime—hours generally 10 to 4—under pledge to enter no residence, attend to their business, and return home. People living in the infected town are not allowed to enter the clean one, and certain classes of (or all) merchandise are barred.

It depends on two principles:

(1) *That the infection of yellow fever is mainly confined to the habitations of men and their environments.*

(2) *That the disease is not liable to be contracted in the daytime.*

The first is unquestionably true, and in towns which have a business district distinct and at a considerable distance from the residence portion there is extremely little risk of infection in the business portion of the town night or day, unless the infection of the town be very general.

The second is, I think, true to some extent, and if *bright, clear day out of doors* be substituted for "daytime," probably to a very considerable extent. Still, most of the evidence brought forward to establish this point involves the first also.

The fact remains that people entering a town infected with yellow fever, for business only, coming in after the sun is high and leaving before the late afternoon, rarely contract fever. The instances, however, where communities allowing "daylight" communication have received infection are not rare, and while we (and they) generally explain it by showing that it was some carelessness or bad faith of the person who brought the fever, still, the fact remains, and places holding such communication for a long-continued period will frequently become infected. In proportion as this privilege is confined to reliable business men, to short hours, clear days, and rigidly supervised, it is safe (or rather little dangerous), but women are prone to visit friends.

The detail is easily worked out.

As a general principle in quarantine operations the guards are most efficient if taken from the country to be protected rather than from the town quarantined, although we always desire to make all possible expenditures among the people of the town, because they need it.

WORK IN THE TOWN TO SUPPRESS FEVER.

The question here is, Can the fever be suppressed?

(A) If there be few foci in town, and they be known, there is good chance of suppressing the fever. If, in addition, all who have been exposed to infection are known and can be properly provided for, this chance is much increased and we can usually attain success.

Thus, at Cayuga, Miss., in 1897 Dunn found two foci of infection. Those who had been exposed to infection were in 13 other households. These were kept under observation. In 5 no fever developed in ten days, and they were released. In the remaining 8 fever developed and went more or less through the households. Proper and efficient sanitary measures of isolation and disinfection were taken, and there was no further spread. Similarly, at Franklin, La., although the problem was more difficult, as it was not possible to determine all who had been exposed to infection, yet by similar measures and careful inspection the same result was attained, as also at other places.

(B) If the fever be confined to one section of the town, even if pretty general therein, it may be possible to so isolate that part as to preserve the remainder.

This was successfully done in 1897 at Clinton, Miss., by Waldauer and Mayor Coleman. A cordon was placed about the infected portion of the town and the disease was confined to 18 houses—about 73 cases—the remainder of the town, about 200 or 300 houses, escaping. This work and at Cayuga, by Dunn, mentioned above, must be characterized as brilliant.

DISPOSITION OF PATIENT HIMSELF.

The patient should if possible, and it generally will be impossible, be moved to an isolated place or a well-appointed hospital. We can practically always keep such a hospital from becoming infected and the infection of an isolated place, should we fail to prevent it, is little dangerous.

How much risk should be borne by the patient and how much by the community is a question which the health officer must consider in advising removal. In general, removal during the first forty-eight or sixty hours prior to the "stage of calm" is not specially injurious. We habitually remove the sick from vessels during this time, and they get well. After that time it is to be deprecated.

PREMISES WHERE PATIENT IS TREATED, AND HIS ATTENDANTS.

If moved, all possible precautions to prevent infection of his new quarters must be taken, and I believe we can very generally succeed. If he is not moved, precautions to prevent infection of the premises are even more necessary. They will be less often successful.

Cleanliness, dryness, good ventilation, sunshine, are all important. No fabrics, carpets, hangings, etc., not absolutely necessary, should be allowed in the room. The clothing, bedding, etc., which go with him if moved must be immediately disinfected. A rubber sheet to protect the mattress must be on the bed. The bed linen and shirt must be changed daily, oftener if soiled; the rubber sheet changed when necessary. All fabrics used about the patient should go immediately—in the room—into an antiseptic solution. The floor is to be wiped up daily with a similar solution. All excreta* should be disinfected or destroyed, and, in short, every detail to prevent contamination of environment by the patient be carried out.

* Observations by Archinard, shortly to be published, gave no cultures of the *B. Sanarelli* in the urine or black vomit; rarely in the scrapings of the skin (face, throat, and chest); more commonly in the exhalations and excretions of the mouth. As this bacillus is found in the blood, it may be that the blood from the gums was the source of contamination. That it was not found in the black vomit (blood), may have been due to its acidity. The feces were not examined, but from the similarity of the behavior in cultures of this organism and the bacilli of the colon group and the fact that abrasions of the intestinal mucous membrane, and hence the exudation of blood in the intestine, are universal in yellow fever, it is highly probable (certain?) that the feces do contain this organism in large number and are thus the main source of its elimination from the patient. One case in Franklin in 1897 is traceable very clearly to feces or urine of a yellow-fever patient.

PROPER AND INTELLIGENT ASSISTANCE.

The presence of intelligent trained attendants is necessary to carry out these measures, and no consideration of economy can be allowed to come into conflict with this effort to prevent the establishment of a new focus of infection.

The above principles are to be observed in the premises in which the patient is treated, whether they be those in which we find him or those to which he is moved. They are to prevent infection or further infection. If he be treated in the house in which we find him—presumably infected before the institution of these measures—such measures as are possible to destroy the infection, which already exists, must also be instituted.

If possible, prepare a room for the patient on the upper floor, which is sunny and well ventilated, by removing all superfluous fabrics, etc., and scrubbing it out with bichloride solution; then move him into it, and keep it clean. Disinfect as well as can be done without disturbing the patient, and very efficient work can be done. Everything possible must be disinfected—scrubbing all parts of the house, the late sick room especially, with bichloride solution, disinfecting (or destroying) the used bedding, upholstered furniture of the room, etc., and keep the house, the sick room especially, open to sun and wind to the fullest extent as long as it is dry weather.

Pay especial attention to the places where the excretions of the patients have been thrown and to any soiled clothing that has been used about him, etc., and, finally, as much cleaning up and disinfection outside the house as can be done and may be needed, should be promptly attended to.

The only town in 1897 (until cold weather) which could show a single case of fever without any spread was Perkinston, Miss., where a very careful disinfection was begun on the third day of the disease and a careful asepsis carried out to the end. The premises, also, were under guard. The work planned as above was carried out by Dr. Champe, of Perkinston.

If the patient be moved, the premises are to be disinfected by immunes, who need only disinfect their clothing, hair, hands, etc.; or, if this be impossible, by nonimmunes, who must disinfect the same way and be treated like the original nonimmune inmates of the house.

The house in which the patient is treated (unless a hospital, which we feel sure we can keep free from infection) is to be treated, until it is disinfected, like an infected place, although we can frequently prevent its becoming so. It is to be put under guard and no ingress avoidable allowed. There is no theoretical reason why egress for short periods (hours) should not be allowed to those feeling perfectly well if sure of the sterility of their clothing, hair, etc., and it would keep them in better health—hence less susceptible to infection—to take exercise. Yet, owing

to the willingness of people to take risks for their neighbors and the rarity of sustained carefulness in the laity, I would in general not advise this. Hence, no egress. Still, there may be circumstances in which this may be allowed. It can be made free from danger by intelligent supervision.

PRECAUTIONS TO BE TAKEN BY ATTENDING PHYSICIANS.

The physician, if not immune, must take precautions not to establish a new focus should he develop the fever, regulating his disposition of himself on the hypothesis that he will develop it. He should especially not sleep at any house in which it would be objectionable for him to develop fever. It seems to me best that he should stay on the premises with the patient. In any case he should wear clothing little liable to convey infection—linen or other smooth clothing, or change it if he goes out. I know this is very seldom necessary, but sometimes it is, and *if the patient be regularly attended through his illness, and much time spent in his room*, there is a slight indeed, but real, risk of conveying infection in this way.* These precautions are recommended only when there are very few patients and every real risk, however slight, is to be avoided.

PREMISES CONSTANTLY UNDER GUARD.

Until these premises are released from observation they must be under guard. This has already been stated. These guards should be immune and precautions taken against the conveyance of possible fomites by them.† If immunes are unattainable, the guards must be under closer supervision, as they will be exposed to possible infection. They must sleep in the guard camp, be inspected twice daily, and other precautions taken, lest they establish new foci, if they develop fever. They should be, of course, as little exposed to infection as possible, and it is, indeed, generally nominal.

DISINFECTION OF PREMISES.

The premises of the patient and all things in them, including the patient and attendants, must be disinfected as soon as possible on his death or recovery, using the precautions about the disinfectors previously given.

*The writer believes (oral communication from Dr. Tarlton, of Patterson, La.) that yellow fever was thus conveyed to Patterson in 1878, and considers it very probable (oral communication of Dr. Folkes, of Biloxi) that it was thus conveyed in one instance to a house near Biloxi, Miss. In both cases the physicians, believed to have conveyed the disease, had been long in the infected rooms (which were badly infected) and in prolonged intimate contact with the sick, his bed, etc., and indeed under the conditions usual with nurses rather than physicians.

†Three instances have come to the writer's notice of foci of infection established by guards.

WHEN DOES CONVALESCENT BECOME INNOCUOUS?

At what time during his sickness or convalescence a patient becomes incapable of infecting his premises I do not know, nor can I find any observations or even opinions on this subject, and yet it is a very practical matter for sanitarians.

DISINFECT NEIGHBORING PREMISES.

The premises adjacent to those of the patient which from propinquity, communication, or direction of wind can reasonably be judged to have received infection are also to be disinfected.

DEPOPULATION.

In addition to these means to prevent infection of premises and, failing this, to isolate them, a most valuable adjunct in suppressing yellow fever, existing under the described conditions, is depopulation of the neighborhood and of the presumptive focus. How far this should be done is implied in the paragraph on aerial transmission of infection; but the wider and more completely (within limits) it is done the better from a sanitary standpoint. Reasonable precautions are to be observed lest new foci be established by some of these people who have been already exposed to infection. (See "Disposition of suspects.")

This depopulation, however, is meant to extend well beyond the distance to which fever may be reasonably expected to be aerielly transmitted from the focus, the intention being to render the focus as isolated as possible from people. Indeed, a general depopulation of the town, safely done, is of much aid in suppressing the fever. In general, however, it is scarcely advisable.

DISPOSITION OF SUSPECTS.

Now the inmates of the house of the patient (unless immune to yellow fever) should be removed from the house, all clothing, etc., disinfected, and kept under observation, "quarantined," in a place free from infection and so situated that if any of them sickens he may not establish a focus of infection dangerous to the community, i. e., either in locality insusceptible to infection as to northern points, Atlanta (Arbita Springs?), etc., or so isolated by distance and guards that its infection will do no harm to others (Camp of Detention). Indeed it is not generally difficult to prevent such a place from becoming infected with yellow fever, if one has charge from the beginning of a suitable place, even if fever develops among the suspects.

These people, if in an infectible locality, should be inspected twice daily until the period of incubation has passed, and if one of them sickens, he must be promptly isolated from the remainder (or better, left where he is and the remainder isolated from him) and measures of disinfection taken. If in noninfectible territory all this is unnecessary.

If it be impossible to remove the inmates to a place of safety (it should never be, save by their own will), they must be quarantined in the house. This is bad—bad for them and bad for the community—because there is thus risk of prolonging the existence of the fever in the infected house. Their own risk being optional, they must take it for the safety of the community. Here measures previously inculcated to prevent infection of the house are especially necessary.

It is to be noted that if the case be discovered early—time limits not definitely determined—the premises apparently are not yet capable of communicating infections to persons, and the inmates have not, so far, been exposed to chance of infection. This is a reason for their prompt removal, and the statement one so often hears, “I had as well stay, as I have been here — days,” should never be allowed to weigh with health officers in allowing these people to ignorantly risk their lives.

Those who have been exposed to infection—not inmates of the patient's house—must also be provided for. If possible they should be sent to noninfectible territory or to an isolated place (Camp of Detention) and kept there under observation during the period of incubation of the disease, due care being taken that they are not exposed to any infection, as by fomites carried in, while isolated.

If neither of these methods are practicable, they must be inspected daily or, if possible, twice daily at their own houses, and measures, as before indicated, taken should they become sick.

There is no theoretical reason why these people may not pursue their ordinary avocations while well, as during the stage of incubation the disease is not transmissible, but there is every reason why they should not sleep away from home (fever very generally developing at night), and, unless they be trustworthy, they had best be kept on their own premises. It is to be noted here how rarely people taken from infected premises and placed in camps, or under the conditions of camp life, develop fever. Whether it be the relief from anxiety or the open-air life, the fact remains that the development of fever among suspects in camp is rare. I know of no definite comparative statistics, but the fact has been remarked by all who have had experience and whose attention has been called to it, that development of fever among people in camp is far less common than among an equal number isolated in their own houses.

Measures of this kind are taken for the purpose of preventing further development of the fever—“to stamp it out.” They certainly give a fair chance of success if the early cases are reported. Failing this, they will greatly retard its rapidity of spread and will have done good in proportion to the lateness of the season. Indeed, if the season be very late, it may be advisable, in spite of what will be said presently, to continue these measures or a modification of them even after we have no hope of suppressing the fever by their means, for the purpose of lessening the rapidity of spread of the fever, which is then extremely desirable, being indeed equivalent to an earlier frost.

The stringency with which they should be then administered depends on many conditions, mainly the lateness of the season. A balance is to be struck between the good to be gained and the hardship imposed.

HOUSE QUARANTINE OF NO AVAIL IF MANY CASES ARE CONCEALED.

And here let me also say that the measures above outlined for use prior to an epidemic are recommended where practicable—i. e., when the authority or influence of the health officer is sufficient to carry them out.* Should the condition be such, however, that the attempted enforcement of these restrictions leads to the successful concealment of cases they must be modified, *as successful concealment of cases takes away all chance of suppressing fever.*

Our reliance is then placed on preventing the infection of his environment by the patient and preventing ingress. Above all, the first is important and is to be depended on. The presence of the sanitary inspector and of the trained nurse necessary to carry this out are such boons to the patient that we may be sure that no cases will be concealed on account of these measures, if reasonable tact be used.

Indeed, the aim must be in all cases to make the household with the yellow fever a *privileged one*, so that it will be to its interest if there be a case among them to have it officially known.

To this end physicians and medicines, delicacies for the patient, and even subsistence for his family free, are wise sanitary measures as well as charities.

Remember, if cases are concealed to any considerable extent our chance of suppressing the fever is lost.

MEASURES NECESSARY WHEN THE FEVER CAN NOT BE SUPPRESSED.

The townspeople are always loth to recognize that this condition exists, but when we find cases arising of which we can not trace the source of infection, when we are unable to efficiently carry out the measures here outlined, or when cases are being successfully concealed we may know that the fever will not be suppressed until it has run its course or cold weather supervenes.

* Obviously it is implied that the state of feeling in the community is to be taken into consideration also. Measures which will be readily agreed to and carried out in good faith in one community will excite violent and unconquerable opposition in another.

The observation of the writer is that, in small towns at least, Americans of English descent will willingly bear any reasonable amount of inconvenience and some hardship if convinced that this is necessary to avert a greater calamity from the rest of the community, whether of their own town or neighboring towns, and if convinced of the reasonableness of the measures to be taken will assist in carrying them out. The case of Jesup, Ga., which closely guarded itself, well illustrates this, as does the "house quarantine" in Franklin, Perkinson, and several towns in north Mississippi. It is paralleled by the history of not a few English towns with the plague. The sense of duty to the community seems to be strong.

ILLICIT COMMUNICATION.

An infected town is a source of danger to its neighbors, no matter what means of quarantine are taken. This is because a certain amount of illicit communication from the town to clean territory will be kept up, no matter what rules and regulations are made. The danger is almost exclusively due to those who leave the town for infectible territory. It is in proportion to the number who thus leave directly and to the proportion of infection in the town, hence to their product. Thus, 100 persons leaving when there is 1 per cent of the town infected conveys the same risk as 10 people if 10 per cent of the town be infected.

It is our aim, then, to reduce the number who leave directly for infectible territory to a minimum (and, if possible, have none to leave). But to take such risk of leaving as must be taken rather in the beginning of the fever, when there is little infection, than later, when there is much more, we first take measures to prevent these people leaving directly without sanitary supervision—i. e., establish quarantine, and, second, arrange for their leaving under such conditions as will not convey infection to clean territory.

MAKE LEGITIMATE COMMUNICATION EASY, AS BEST PREVENTIVE OF ILLICIT.

This allowing some means of egress from the infected town should go hand in hand with the prohibition of unsafe egress, not only on the ground of humanity to the townsfolk but because a legitimate means of egress being provided, the number of attempts to pass the lines in other ways—a certain proportion of such will succeed—is enormously lessened, *and the providing of a legitimate means of egress, if safe, is an added safeguard, and an important one, against the infection of clean territory.*

While it is scarcely necessary to cite instances of this, many can be given; it is self-evident, certainly to all who have had experience of epidemics and seen the imperfection of the best devised prohibitive measures. On the same principle this means of egress should not be made more difficult than is necessary for safety. We wish to encourage its use; to have it, rather than an “underground railroad” selected by those who would leave.

Depopulation, then, which has long been recommended as a valuable means of lessening the horrors of an epidemic in the interest of the infected town, is not less valuable as a protective measure to the surrounding infectible territory.

EARLY DEPOPULATION SAFER THAN LATE DEPOPULATION.

Stress should be laid on early depopulation. There is then not much infection in town, and not only are people who leave escaping risk to themselves by leaving early and lessening the rapidity of the spread of

the disease in the town, but the chance of infection of outside places from any mishap which may occur is less than if it should happen later.

CLASSES WHO MAY LEAVE.

All who have been certainly not exposed to infection, which we would be able to say of few later, should go without let or hindrance.

The others may go (1) directly to points incapable of receiving the infection of yellow fever, generally northern points—high altitudes—to remain there indefinitely, or for a time to cover their incubation; (2) to points capable of receiving such infection but through a camp of detention.

By a “camp of detention” is meant any place at which these persons stay unexposed to any infection a sufficient time to cover their period of incubation. No infected article going within.

PEOPLE LEAVING FOR NONINFECTIBLE TERRITORY—POINTS NORTH.

(1) How to get these people through infectible territory to their destination without infecting it is a problem of “traffic,” and will be there considered. Before these people are allowed to go north we must be assured that they will remain there to cover the period of incubation of yellow fever, say ten days, or indefinitely, i. e., after frost.

TREATMENT OF BAGGAGE.

Disinfection of baggage is not necessary for such people. If, however, they will return after a time to points South, their baggage must be disinfected on departure. Indeed, if there be any reasonable doubt of their not returning, the burden of proof being on them, disinfection of baggage must be done.

The methods by which the train inspector, on whom this work falls, assures himself (1) that a passenger intends and will stay North indefinitely, and (2) that he will stay ten days and not double back, must be worked out for each particular epidemic, and to a certain extent to each particular road and case. A good man will err by over suspicion and hard rulings.

TRAIN INSPECTIONS.

A person leaving New Orleans in 1897 took an affidavit—the stub of which was preserved by the train inspector—that he “would not return to any place quarantined against New Orleans” or that he would not return to quarantining place “for ten days.” In the latter case his baggage was disinfected and a certificate of disinfection given him giving the date of his departure from New Orleans, and of course the same date of disinfection and the number and kind of pieces disinfected. A label of thin paper was then pasted on each piece of baggage. The certificate of date of leaving New Orleans had a personal description, and the baggage label was made of thin paper so it could

not well be detached and used over again. It had the name and date on it, and was signed.

It seems best to disinfect all baggage going to remain at points like Atlanta, Charlotte, Nashville, etc., which are great distributing points for railroad travel south, and the only baggage ever sent to any such places undisinfected in 1897 was that of some schoolgirls going to Nashville to a seminary the latter part of October. Indeed, Atlanta required this to save herself from quarantine by the coast cities.

There seems no reason why baggage going north through these places should be disinfected, any more than Havana baggage going by the Ward Line to the same points. Indeed, there is good sanitary reasons for not doing so. Every obstruction, however slight, put in the way of people leaving an infected town to some extent prevents their leaving and to a disproportionate extent induces them to put off leaving if they do leave. We want them to leave early. Again, as before said, no quarantine is perfect, and in proportion as a safe and legitimate way of exit is obstructed the illegitimate ways are sought, which is (especially if sought after the town is well infected) dangerous in the extreme to the territory we seek to protect.

Unless we have been in an epidemic on the inside we fail to realize what slight obstructions prevent people leaving an infected town by the ways provided and induce them, for the purpose of avoiding moderate inconvenience, to take sanitary risks for others which are simply appalling. The rule which should obtain, then, would be to "require everything which is necessary for safety and nothing which is not necessary," throwing, of course, the doubt in favor of stringency.

Arrangements should be made with sanitary inspectors at places to which most of these people go to return South again—Atlanta, Nashville, St. Louis, etc.—so that they can keep some supervision of them and see that they do not leave for the South until their ten days are past. It would not be difficult to arrange for a pretty fair supervision. It will require to be supplemented by a train inspection south from some of these places. This latter has always been put on.

(2) Persons leaving for infectible territory through a detention camp. The method of conducting detention camps in detail will not be described. They require much pains and care in their management. I would again call attention to the sanitary protection they afford to the quarantining places as well as advantage to the infected town by letting its people escape. By providing a safe and allowed means by which people who can not go North can leave the infected town, the effort to evade quarantine restrictions is lessened and the seepage, so to speak, through the cordon is minimized. It is extremely difficult to prevent people evading quarantine who have friends willing to receive them outside, and these are the very people who will go through a camp.

For the same reasons as given for not disinfecting through baggage, the camp should be made as pleasant as possible, and impose no restric-

tions which are not necessary to prevent the conveyance of infection. The writer holds that it should be known that it will not be held open indefinitely, but be closed after a limited time, so that those intending to avail themselves of it should not unduly put off coming to it. The earlier the people come to camp the less fever will develop among them; and while the development of fever at a camp is to be expected, yet it is to be averted as much as possible. It is surprising how little does develop.

WORK IN THE TOWN.

It is no part of this paper to describe the "relief measures" to be taken in the town for the care of the sick, relief of pecuniary distress, etc., only such as appertain to purely hygienic "quarantine" work. They have, consequently, not been considered. They are not the less important.

A modification of the measures of disinfection and isolation heretofore outlined may be of use in lessening the rapidity of spread of the fever even when we no longer hope to suppress it, and I quote from the latter part of a paper read by title at the Mobile Conference, on "House quarantine."

House quarantine during an epidemic.—Here, it seems to me, no elaborate or specially restrictive measures are advisable. Certainly in large towns, and with the epidemic well under way, none are practicable. To attempt too much is to fail and do less than if less were attempted.

The aim should be—

- (1) To prevent infection of sick premises and to keep the other inmates from developing fever from such infection as we fail to prevent.
- (2) To prevent unnecessary ingress of people in the sick room, or premises.
- (3) To prevent conveyance of infection from sick premises to outsiders.
- (4) To destroy, as far as possible, the focus (presumably) thus established.

Of these, the first, second, and the fourth are now the most important.

(1) The removal of unnecessary fabrics from the sick room, cleanliness, aeration and destruction or disinfection of the discharges are about all that can be done to prevent infection of premises. The isolation of the inmates from the sick room should be advised and the advantage of sleeping in the upper story remembered.

(2) The means which will prevent ingress varies with the respect for the law and the good sense of the community. In some places, as at Montgomery, Ala., an official prohibition and placarding is sufficient, and when this is not it is doubted if the measures which would be are advisable. In general, simply designating the houses and prohibiting entrance is all that to me seems advisable.

(3) Perfection here would be change of clothing, disinfection of hair,

etc., on the part of those leaving the house. Free egress would then be harmless. This can not, in general, be enforced, but the change of clothing should be recommended and ordered and will be followed to a considerable extent, and to that extent do good. There is less risk in even free unconditional egress than is generally believed.

(4) The premises should be disinfected with as much thoroughness as will not lead to such obstructive measures—concealment of cases—as would defeat our ends. Burning the certainly infected heavy bedding (soiled mattresses, etc.) and replacing it by new articles is not only good per se, but does much to make disinfection popular, and hence more general and efficient.

It was found last year that the disinfection of the person—required in some towns of all in the house—was more objected to than everything else and, save for the patient, I would not require this and would be satisfied with soap and water for him.

If an epidemic begins early in the season it may well be a question whether even the method here outlined, which works little inconvenience and no hardship, is worth attempting. An epidemic of yellow fever well scattered in a town will be apt to go through it.

The propositions presented for adoption in the above-quoted paper are also reproduced here for adoption.

(1) House quarantine may be an efficient means of suppressing the spread of yellow fever in a city.

(2) It may also be an efficient means of retarding its spread.

If used for the first purpose there being but few cases of yellow fever in the city,

(a) The nonimmune inmates of the patient's house should, if they remain in the city, be moved from that house immediately and kept under observation in an isolated place free from infection.

(b) The patient if not in a suitable place, and it be safe to move him, should be moved to one, and the premises disinfected.

(c) The premises the patient occupies should be under guard, prohibiting ingress and egress of persons, save as absolutely necessary and under sanitary supervision.

(d) Every possible precaution must be taken to prevent infection of his environment by the patient.

(e) Guards must be under sanitary surveillance.

(f) The premises of the patient should be thoroughly disinfected on death or recovery of the patient.

(g) That if the conditions be such that successful concealment of cases be caused by the measures adopted they must be so modified as to avoid this and such restrictions removed and privileges added as may be required.

If used for the second purpose, during an epidemic,

(a) Such precautions as are not too onerous should still be taken to prevent infection of premises of patient and inmates of his home.

(b) Ingress into the infected premises should be discouraged and unnecessary ingress forbidden.

(c) Egress from the infected premises should be freely allowed, with such precautions, as change of clothing, etc., as can be enforced.

(d) The premises should be disinfected on death or recovery of the patient.

(e) These measures are advisable in proportion to the lateness of the season.

DISINFECTION.

It seems better to put these few points on disinfection of premises by themselves. They really belong on page 73, "Premises," but to insert them there would, I think, break the continuity of the sketch. It is not proposed to give a description of the process, only to call attention to a few points not always noted.

A. The owner must be insured against any loss from disinfection. We must do no injury, or pay for what we do. If this be not done, it may lead to concealment of cases of fever or else to concealment of fabrics especially valued, which thus escape disinfection.

B. Unless the disinfector be experienced, it is well to do as much burning,* wetting and soaking in antiseptic solutions as possible, using gaseous disinfectants as adjvants.

C. For gaseous disinfection the house must be close or must be made so. For thick fabrics—cotton quilts, mattresses, pillows, beds, etc.—gaseous disinfection can not be depended on, if more than their surfaces be infected.

For the disinfection of these articles steam is required, and, indeed, it is advisable to use this agent for all fabrics where attainable. Boiling, of course, is equally (absolutely) efficient, as soaking in an efficient germicidal solution. The writer would state that his observation leads him to have full faith in the use of sulphur dioxide if properly used; also, it has been his experience that this agent very rarely is properly used outside maritime quarantine stations. He has full faith, also, in the efficiency of the aeration of fabrics.

Prolonged exposure to sun and air, reasonably dry air, will disinfect any ordinary fabric from yellow fever as completely as burning, and if the choice be between gaseous disinfection as usually applied and aeration he would, by all odds, prefer the aeration. Of course the location of the premises is frequently such that aeration of infected fabrics is not possible. The house should be kept open, well ventilated, and dry after disinfection.

* Not a few cases of development of fever has been ascribed to burning infected articles. Whether the current of air caused by the fire carries the agent of infection through the heat, etc., may be a question. If the surface of the pile be pretty thoroughly wetted with coal oil and this fired first, it would seem impossible that infection would be thus spread. The writer has no personal cognizance of any spread from burning infected articles.

D. The premises outside the houses must be made clear of trash—chips, leaves, pieces of board, etc., rotting wood being believed to be an especially bad nidus of infection. The mere wetting of these things as they lay with bichloride solution is not thorough disinfection, the underside seldom being reached by the solution.

It is an injury to wet the leaves of living plants with bichloride of mercury. It kills the leaves, etc., and after a rain has washed the bichloride off, these dead leaves are a good nidus (culture medium) for any infection not destroyed, as on the underside of the leaf. It is not reasonable to believe that the living leaf would serve such an end.

E. The thorough wetting of the cleaned ground, ditches, etc., with bichloride solution or covering it with chloride of lime is doubtless efficient, but unquestionably the disinfection of the outside premises by fire is the method of election.

This is best done by the Barber asphalt furnace as used by Farrar in New Orleans in 1897, which is fairly manageable. If this machine is not available, ordinary fires built and continued for a considerable time, as done by the writer at Conquests Camp and at Brunswick, Ga., in 1893, is absolutely efficient but far less manageable and more apt to set neighboring structures afire.

The introduction of the asphalt furnace by Farrar is a distinct and valuable addition to our disinfecting armamentarium, and indeed is equivalent to giving a new and most efficient "method," for it renders quite generally applicable a method which was but rarely used by the crude means used in 1893.

By watching the houses to the leeward of the disinfected house one can sometimes form a fairly good idea of the efficiency of the work done about the premises, even if the nonimmunes do not return to those disinfected.

F. Disinfection, when we hope to suppress the fever, must be thorough. Everything must yield to this. The evil we seek to avert is too serious to weigh expense, or convenience, or hardship against it.

G. When we no longer hope to suppress the fever and use this measure simply to limit or lessen the rapidity of its spread the extent to which it should be carried out depends, as so many other quarantine measures, on the balance between the good to be attained and the cost, including hardship and inconvenience. In general, the fabrics of the sick room and nurses' room and these rooms themselves should at least be disinfected. This, if done by some method not injurious and little annoying—formaldehyde and steam, and scrubbing the floor with bichloride solution—will not make the second factor large, and will, I believe, in a considerable number of instances prevent the further infection of the household. No one who has examined the lists of the sick by houses, as in post-epidemic disinfection, can fail to be impressed with the fact that yellow fever is to a considerable extent a house disease, even during an epidemic.

MEASURES TO BE TAKEN IN A DISTRICT THREATENED BY YELLOW FEVER.

By Surg. H. R. CARTER.

The measures to be taken in the district threatened by the yellow fever epidemic depends to a great degree on what is done in the infected district, including its immediate environment.

Perfect cordon
impossible.

If a cordon absolutely perfect were around the infected district and the arrangements for mail, freight, express, and passengers were also perfect, nothing need be done by places in the threatened district any more than by the country at large with a good maritime system on account of an epidemic in Havana. It seldom or never happens that these conditions exist, and precautions to supplement imperfections in our first guard are requisite. It is well at first to determine on the limits (next to the infected town) of certainly clean territory. The district between this and the territory adjudged infected, or probably infected (the so-called "neutral zone"), requires special attention.

Neutral zone.

Before a cordon is established there is almost invariably an exodus into the country adjacent to an infected town, and after it is established there is especially at first a certain amount of seepage, so to speak, through the cordon. Also the district adjacent to a large town will probably elect to continue some direct communication with it, choosing rather to run a certain risk of infection than to interrupt their trade relations entirely. Unless this action unduly risks other communities, I think it is to be allowed. This communication, too, may be so guarded that the risk is minimal ("daylight communications," etc.), and yet these districts should not be considered for quarantine purposes as "certainly clean."

This region (neutral zone), of possible contamination, yet which we try to keep clean, is to be held as infected so far as communication with clean places is concerned and as clean with regard to that infected district. It should be

subjected to frequent inspection, and it frequently happens that a district rendered suspicious by an early exodus of refugees may subsequently be pronounced clean.

The local passenger trains running from the direction of the infected town should be inspected. This is because a certain number of people may come out even to considerable distance from the infected town or district in private conveyance and take the train in clean territory at way stations. A proper system of inspection and certificates of residence materially lessens this risk. Train inspection from South.

Inspection must begin at the starting point and go as far as these people are likely to travel by private conveyance. More than this is unnecessary. At some suitable place on each road a place for the temporary detention of suspects is to be established. They should be put off the train at this place and as soon as practicable sent back to the general camp of detention. It may be advisable, however, to make other disposition of these suspects. There is no need of inspectors meeting the train before coming to each city.

A main object of this inspection (of local passenger traffic) is as far as possible to prevent suspects getting on the train—that of the through passenger traffic to prevent them getting off in clean territory. The station agents of the railroads may be our most efficient assistants.

Whether it be necessary to inspect trains from the North, to prevent the return of those who have gone North and not stayed long enough, may be a question. I think it is generally unnecessary and generally inefficient. On such trains, however, as have inspectors on them going North the inspection on the return trip should be done as an added precaution. Trains from North.

There is a section of highland, the southern end of the Appalachian mountain system, which projects into the South, into which refugees may safely be allowed to go, but from which, owing to its proximity and other causes, a train inspection should be maintained. In this district, especially in railroad centers like Atlanta, it is also well to keep as much supervision of the movements of refugees as possible, keeping their addresses, etc., for ten days. Uninfectible region South.

The country adjacent to the infected district, having due regard to means of communication as well as distance, should be inspected thoroughly and often, and kept inspected. This is necessary both for its own safety and that of the country beyond. The inability to do this on account of unwise quarantine restrictions was, I think, one cause of the spread of the recent epidemic. It is also of

Inspection of
healthy towns.

the greatest commercial advantage in quieting rumors and allowing traffic to go on unimpeded, and if this work be done as a matter of routine the presence of the inspector will cause no alarm or excitement. This inspection of healthy places may be widely extended in territory having even well-guarded communication with the infected district with the greatest advantage.

Inspection of
Freight.

In towns of considerable size it is well to have an inspector of freight and express to see that none is landed without proper certificate. It is a check on the work in the infected district.

Provisional
isolation camps.

Towns considered especially threatened by yellow fever should establish in some safe place a small isolation camp of both tents and buildings, where an important case of fever can be removed, if it be right to move him, and where those presumably exposed to his infection, or rather suspects, may be isolated. Time and risk of infection will be saved by having this ready.

Cordon around
healthy towns.

A place may be so isolated as to be in extreme danger of infection, generally by proximity, from an infected town. In this case all ingress must be subject to sanitary supervision and a cordon around the clean town may be required, and practically the same system be adopted as for a besieged city. By this method Kenner, La., 11 miles from New Orleans, received no infection in 1897.

MEASURES TO BE TAKEN IN AN INFECTED AND NONINFECTED TOWN.

By P. A. Surg. A. H. GLENNAN.

The experience of this year has tended to confirm my observations made at Key West, Fla., in 1887, where I gained some practical knowledge in the early stages of a yellow-fever outbreak. The first case was discovered in a large boarding house in a populous section of the city. Immediately upon the announcement of the disease these unacclimated boarders scattered to different parts of the city, and owing to defective sanitary and police powers they were kept under a desultory surveillance only. An immediate exodus of other unacclimated people took place, by every available means, to the neighboring keys and the mainland. This is the inevitable tendency in any community upon the announcement of the first cases of yellow fever, and the immediate steps to be taken are, first, the isolation of the sick, guarding the infected premises and contiguous blocks as well, and second, a systematic supervision over all persons and effects leaving such a city or town, with the least amount of hindrance compatible with safety.

ISOLATION OF INFECTED CASES.

In incorporated municipalities, infected premises are generally posted with a yellow flag, and a guard stationed at the front door. This is not sufficient. A cordon of guards—immunes if obtainable—should be established around the infected block and contiguous squares as well.

These guards, when relieved from duty, should not be allowed to go to and return from different parts of the city, but should be maintained at some near central point. A captain of these guards should inspect the day and night watches at irregular times, prevent persons, vehicles, or street cars entering or departing through the lines, see that supplies and necessary articles are delivered at stated times and places, and also to arrest and return persons escaping through the lines. In addition to this, a house-to-house inspection of the infected area should be made once or twice daily by competent physicians, twice daily being preferable, as it tends to reassure the persons in the restricted district.

At the same time a systematic inspection and disinfection of premises, yards, and alleyways should be carried out.

This double guarding of first foci of infection is comparatively inexpensive and worthy of effort, even if unsuccessful by reason of the disease appearing outside of these lines. A result is obtained in a limited time, and the expense can be rapidly discontinued.

In Mobile this year yellow fever was confined for some weeks to twelve or fourteen contiguous blocks, belted by a street-car line only, which route it slowly traveled, although no systematic effort was made to restrict it to this belt. Special stress is to be laid upon the fact that guards should not wander about while off duty. A house guard upon night duty roamed the streets in the daytime, wearing his badge; I afterwards isolated and treated him with a severe case of yellow fever, although he had not entered the infected premises.

Interesting points also to be considered, both legal and sanitary, are the removal of the sick, and local depopulation of small infected areas, under proper precautions, to safe points for observation.

PASSENGER-TRAIN INSPECTION.

The few rudimentary rules laid down in the Report of the National Board of Health for 1879 are not adequate for the present rapid transit of passengers and movement of freight. The object to be attained is to ascertain that no person ill or suspected dangerous is allowed to depart from an infected city or town, and also that passengers are under surveillance while en route to destination.

I attained the first object this year at Mobile by stationing a competent physician at the union depot in that city, who personally examined all would be departing passengers and obtained a signed declaration of their residence, nonexposure to infection, and number of pieces of baggage. To this declaration was attached the inspector's certificate of examination of the bearer and disinfection of baggage. By an arrangement with the railroad companies box cars were located near by, for disinfection of baggage, railway mail, express packages, and other matter. Ordinary shipping tags were attached marked "Disinfected," signed, and stamped with the seal of the Marine Hospital Service. This baggage went through to all points without trouble, though I learned that baggage from other points was overhauled along the line.

The second object was attained by placing a competent physician upon each departing train, to examine the passengers en route, who were persons from New Orleans and the infected Gulf coast towns as well; memorandum slips were taken up, completed, certificates checked up and passed on at the next relay, the inspector taking the return train at the most convenient point. In this way a double-check service was instituted, and after I assumed direction of affairs not a single passenger developed yellow fever after leaving Mobile. In one instance a passenger purchased a ticket without first obtaining the certificate of

inspection. He was detected upon the train and returned to the city by the inspector. The incident was not repeated by the ticket offices. In another case a prominent railroad official with his attending physician departed on passes without certificates and were captured by health authorities in another State and subjected to vexatious delay and disinfection.

Pullman sleeping and upholstered cars should be discontinued, except possibly upon through trains for the North. These, together with ordinary cars, should be treated with the steam air blast, disinfected at some central point, and a dated certificate of the fact attached to each car before it is allowed to return.

Relays of train crews should be made at not less than five miles from an infected city or town, and another preferably at the State line. It is not necessary to transfer the passengers into new coaches, the experience of this year showing that they are best detained for observation near their point of destination.

Train crews, when changed however, should be rigidly kept from mingling, both on freight and passenger trains, as my experience shows that these men, from their environments, offer greater danger along lines of travel than from any other source.

FREIGHT DISINFECTION.

The disinfection of freight and box cars is best performed outside the city limits, with due regard to its classification. Flat cars are not specially a source of danger, but if their external surfaces are required to be treated it is quickly done with a hand force pump, hose, and spray nozzle, from a barrel of bichloride solution swung upon a light wheel truck, which can be moved along the line of the train; this will also answer for disinfecting the interior of empty box cars. The work is more effective, cheaper, and timesaving, than by fumigation, to say nothing of the *absurd method of placing a sulphur pot upon the open track beneath a flat car, which I heard of in one or two instances*. This may be classed with the exploded theory of refrigerating freight in box cars, as a method of disinfection.

The cars should then be lead sealed and a red label pasted (not tacked) to the outside marked "inspected and disinfected," dated, and signed.

There is no necessity for transferring freight to new cars at any relay station.

Freight upon steamboats is preferably disinfected before being placed upon board, the vessel and the crew being inspected, and disinfection carried out where necessary. Only classified articles should be accepted; household goods, trunks, etc., rigidly excluded. If passengers are accepted at all upon steamers running to interior points, they should be carefully examined and their baggage disinfected, as in the case of passengers departing by train.

Highways and other outlets from an infected place should be guarded, possibly by the municipal and county officers, although a great amount of good is not to be expected from these city officers in the way of preventing friends and acquaintances from leaving an infected place, while they might be trustworthy in keeping out any threatened danger.

DISINFECTION OF THE MAIL.

Considerable delay and dissatisfaction was caused during the past season by rural communities refusing to accept mail matter from an infected place under any circumstances.

In my opinion, mail bags and mail matter from any infected city or town of considerable size should be disinfected with formaldehyde gas while en route. The mail matter and bags can be scattered and hung upon racks in the mail car, lamps or gas generators used, the car sealed and labeled, and the run made to the next general distributing point, where the matter can be sorted and sent back to points outside of the infected district. This method will effect a great saving of time and an assurance of security.

The wooden paddle, studded with nails to perforate letters, is a slow instrument of torture and delay, besides being ineffective, as it plugs the space between the hole of entrance and exit. If necessary, a hopper should be used, but it can probably be proven that the gas is sufficiently penetrating without these punctures.

DETENTION CAMPS.

While depopulation of an infected city or town is to be encouraged in every way by means of through trains to places not liable to propagate yellow fever and willing to receive the refugees under the supervision as already described, detention camps become necessary as filters of a certain portion of a population who are unable or unwilling to travel considerable distances, but who wish to proceed into the uninfected surrounding country, and would otherwise do so surreptitiously. The construction and arrangement of these camps is well known. They are here mentioned as a medium of communication between infected and noninfected places. There are a few points, however, which have developed in the experience of the past season, to which I wish to invite attention.

A. The location of a camp should be selected to avoid the possibility of being shut in between infected districts, and preferably near State lines. The distance in the transportation of refugees is of little importance as compared with a safe outlet, for there is no benefit in detaining refugees under observation to afterwards pass them into another infected place, even if it is to return to their homes.

B. The expense of wooden buildings can be avoided, dining and kitchen houses can be superseded by medium-sized circus tents, or a

number of large wall tents lined together, with central larger tent for kitchen purposes, etc.

Light, portable disinfection rooms in sections can form a part of the camp equipage and be rapidly erected for the purposes intended.

C. The present heavy tent floors, in two sections, should be cut through into quarter pieces for less expensive handling and quicker transportation.

D. In addition to the mattresses furnished a quantity of bedticks should be provided, which can be filled with hay or straw at the camp location, and afterwards destroyed. This is a good idea, suggested to me by Steward Peck of this service.

If these equipments are organized in sections, heavy and bulky material dispensed with where possible, the establishment of a camp will be numbered in days instead of weeks. As soon as they have accomplished their purpose and ceased to be useful they are also more rapidly shifted, in sections, to other fields of usefulness.

MEASURES AT NONINFECTED PLACES.

The second part of your instructions, to state what precautions should be taken at uninfected places having communication with places which are infected, is complex and difficult. This is due to the fact that in several of the States (Florida excepted) individual counties, villages, and settlements are a law unto themselves as regards sanitary matters. Probate judges, mayors, and self-constituted village authorities proclaim a quarantine against the world. Trains are not allowed to pass through their territories under any regulations or at any rate of speed. The roads are tied up. Advantage is taken of the situation to twist commerce for selfish interests. To my knowledge the stock of liquors and provisions became exhausted in one of these places, and an offer was made to raise the quarantine for two days, obtain a fresh liquid supply, and close it down again. Over all this situation the State boards of health have only advisory powers, and their advice is often received with derision.

I have observed, however, that where a strict total nonintercourse was proclaimed the object has been signally defeated in time by the entrance of the disease. In some cases where mail was absolutely refused from an infected place it was sent to St. Louis and other points under cover for remailing.

Certain general procedures, however, may be outlined, following somewhat the rules laid down for departures from an infected city or town.

First. An inspection station should be located not less than 5 miles outside of the corporate limits, where passengers and baggage considered safe can be transferred and admitted upon a local train, other passengers and train crews being excluded, and to pass through at a speed of not less than 10 miles an hour.

Second. A camp of detention is of greater benefit near points of destination than if located just outside an infected district. Diversity of routes and mingling with other travelers are avoided after undergoing the period of observation, and greater confidence is given the pratique.

Third. The municipal police and county officers, in a noninfected place, display greater zeal in keeping out irregular communication by road and water ways or other means of entrance by circumvention.

Fourth. Mail matter should be received from the first distributing point of the postal service to the northward or outside the infected district with a general authoritative certificate of safety.

Fifth. Freight, express matter, and rolling stock if not already certified to as "inspected and disinfected," should be treated at the relay station outside the city limits before being admitted.

If a proper surveillance is maintained over the arrivals and the steps taken in a suspicious case, as indicated in the first measures for premises in an infected place, a greater degree of safety will be secured than if total nonintercourse is proclaimed.

MEASURES TO BE ADOPTED TO PREVENT THE PROPAGATION OF YELLOW FEVER FROM AN INFECTED TO A NONINFECTED LO- CALITY.

By Asst. Surg. SEATON NORMAN.

I. The patient should be isolated immediately and no intercourse allowed with healthy individuals. The persons exposed should be removed, if practicable, to a different house, or if the weather permits, to a tent provided for the purpose, and should be kept under observation for ten days. As soon as the patient recovers or dies, the mattresses, pillows, comforts, and blankets should be destroyed by fire or be thoroughly disinfected. The house and premises should then be subjected to thorough chemical disinfection and the apartments exposed to sunlight and free currents of air for several days. Disposition of first case.

The attending physician and nurse should, if possible, be immunes.

2. Should more than one case occur, or many foci be discovered, a cordon should be established around the town or village to control the egress or ingress of the people. When more than one case occurs.

The advisability of depopulation will depend upon the size of the town or village, the density of the population, and the number exposed. Where a case has occurred, for instance, in an army post or in a crowded community, an immediate exodus and the subsequent detention of suspects will be the best method of exterminating the disease. In cities a cordon would not be considered practicable, and regulations governing the transportation of passengers, baggage, express, freight, and mails must be adopted.

3. The railroads issuing from, and the boats plying on the river from, an infected port should be under the strictest medical supervision. On the line of each railroad leading from the city there should be established, if practicable, a probation camp at a safe and convenient distance, where persons desiring to leave the infected locality may be detained for such a time as to insure their freedom from infection. Medical inspectors should be placed on each train, so that Supervision of railroads.
Detention camps.

Unrestricted
northern exit.

Railroad in-
spection.

Regulations of
shipment of
freight.

should any passenger develop symptoms of suspicious fever he may be isolated until a station is reached where he may leave the train. The isolation hospital of the probation camp would be the proper refuge for such a passenger. Persons whose destination is north of the southern boundary of Maryland and who do not intend to return within ten days to a point quarantined against the infected territory, may be allowed to proceed. Arrangements should be made for the changing of train crews and railway-mail clerks at stations distant not less than 15 miles from the infected place. Changes should also be required at a point along the route 40 or 50 miles beyond the station where first change is made. Railway inspectors should accompany trains for at least 100 miles beyond any infected place.

The crews and passengers of steamboats should be inspected immediately before their departure, and if the trips are of less than five days' duration, this inspection should be repeated on their return. Only two cases, I think, developed on the various steamers leaving New Orleans during the fall of 1897, and in both instances the vessels were immediately and thoroughly disinfected.

4. The express companies handled very little matter during the late epidemic, forwarding only such articles as required no disinfection.

5. Freight for shipment should be divided into two grand classes: That requiring no disinfection and that capable of disinfection. A specified list of both classes should be placed in the hands of the freight agents of the various railroads.

During the past epidemic in the South such a classification was made by Surg. H. R. Carter, United States Marine Hospital Service, and his assistants' certificates were accepted by the entire South.

NOTE.—Free and uninterrupted daylight communication by rail and boat continued between New Orleans and Covington, La., during the past fall. Covington is a small summer resort, situated on Lake Pontchartrain, directly north of New Orleans, about two hours' journey from New Orleans, and no case of yellow fever was reported there during the late epidemic. If a case did occur there, the conditions favorable to its dissemination did not exist. A similar instance of the capriciousness of yellow fever is recorded by Dr. John P. Wall in the Annual Report of the Marine-Hospital Service, 1889, where uninterrupted communication existed between Seffner, Fla., and Tampa, Fla. Although a few persons in the incubative stage at the time of departure from Tampa developed the disease in Seffner, only 12 miles distant, the infection did not spread.

Intercourse also existed between Covington and Amite City, La., on the Illinois Central Railroad, although the latter place observed strict quarantine against New Orleans. As far as I know no yellow fever occurred in Amite City.

It is barely possible, not probable, that first-class mail matter may convey infection; old and soiled newspapers, coming from an infected house, would undoubtedly be a source of danger.

Disinfection of mails.

While it may be considered that the disinfection of mails is generally a useless labor and expense, clamor and fears of the public may render it necessary.

In the late epidemic in New Orleans, letters and single-wrapper newspapers were submitted to formaldehyde gas in a closed chamber specially constructed for the purpose, while newspapers were disinfected in a steam chamber designed by the service. Supplementary disinfection was also instituted at points farther north on the Louisville and Nashville and Illinois Central railroads.

Refugees should not be permitted to return to the infected territory until after the second frost or until the place has been pronounced by the constituted authorities as free from fever.

Return of refugees to the infected district.

MEASURES NECESSARY AT A HEALTHY LOCALITY TO PREVENT THE INTRODUCTION OF THE DISEASE.

No person from an infected territory should be allowed to enter a noninfected place unless he has complied with regulations relative to a probation of ten days' supervision and in addition to having his effects amply disinfected by the most approved methods. This rule should not apply to immunes, who should be allowed to proceed, provided their baggage and other effects have been subjected to thorough disinfection. Places north of the southern boundary of Maryland incur but a minimum risk in receiving refugees, and cities like Atlanta, which are elevated high above the sea level, may receive individuals from the infected district with comparative freedom from danger.

Restrictions relative to persons.

In the districts where it is known by experience that the disease if introduced will spread, absolute nonintercourse, if possible, should be observed. Even in such territory, communication, under the proper safeguards (such as detention at probation camps, disinfection of effects, etc.), may be permitted with safety.

REGULATION OF TRAFFIC TO, FROM, AND THROUGH YELLOW-FEVER-INFECTED TOWNS.

By P. A. Surg. J. H. WHITE.

A.—TRAFFIC FROM ONE CLEAN PLACE TO ANOTHER THROUGH AN INFECTED TOWN.

(1) *Freight*.—In sealed cars, freight should pass without let or hindrance, but cars should not be allowed to remain in the infected town overnight.

(2) *Empties*.—Empty cars (box) should be passed through sealed, but not allowed stoppage. Flat cars can not become infected, or if so, simple cleaning would remove it, and hence it is a matter of indifference whether they stop or pass directly through.

(3) *Passengers and train crews*.—Passenger trains should be allowed passage through an infected town in daytime and under observation of inspectors, who should prevent any stoppage or any possible communication between any person on the train, crew or passenger, and any other person in the town. Especial care is needed where trains move slowly through a large city, offering opportunity for entry to and exit from them. Special watch must also be kept against tramps boarding trains under these conditions, and, indeed, under any other. Crews may require relay in case of a large city.

(4) *Mails*.—Through mails need no interference.

B.—TRAFFIC FROM INFECTED POINTS TO NONINFECTIBLE POINTS.

(1) *Disinfection of baggage and freight*.—To points North may be generally assumed to be unnecessary, provided ample assurance is obtained that such will not be returned South. Baggage, if there be any reason to doubt its remaining North, should be disinfected with the same care as that for points South. The freight charges would almost certainly bar any returning of merchandise (new). Household goods (old) should be watched more carefully and should be disinfected even if going North, unless late in autumn.

Express matter under same conditions as freight.

(2) *Empty cars going North*.—If going through without stop and left open as freely as possible (end windows as well as doors) to first relay

station and then doors closed, no reason for disinfecting, as the aeration so obtained is most thorough and fully as efficient as need be.

All cars, however, should be very thoroughly swept before starting. The latter is all that is needed for flat cars.

(3) *Passengers and train crews originating in an infected town and bound North.*—Such should from the beginning be under observation, and continue so until they reach a point beyond the infectible zone.

Each road should provide a relay for its train crews near to, but outside, the infected area, where crews should change and the train continue its journey with a crew beyond suspicion.

It would be very advisable when possible to have the relay who take the train in hand in clean country to be (at least the conductor and brakeman) immunes. Of course, this may be impossible.

A sanitary inspector (a doctor) should be constantly on each passenger train and be cognizant of the destination and state of health of each person on the train; should assure himself that they reach that destination, and be aware of their health status when they leave his observation there.

On the return trip, he should be empowered to forbid anyone starting who can not prove his recent whereabouts, and so avoid the doubling back of persons recently out of the infected place and trying to reach noninfected but infectible localities.

(4) *Mails going North, i. e., into noninfectible territory.*—Letter mails for points North need no disinfection; neither do newspapers.

Parcels will hardly need it, but in view of possible return South would best be either barred or disinfected; this may be modified by location of distributing points South. Railroad mails should have same supervision as other mail.

C.

(1) *Baggage and freight to points South, i. e., to infectible territory from infected points.*—All disinfection of these things may and should be done at point of origin, for same reasons given for mail matter, viz: Economizing officers and avoiding possible infection of the camp or other point selected outside for disinfection.

Of course, disinfection outside might be and probably is more certain, but the difficulty and expense incident to the creation and operation of an outside plant would be enormous, and in many cases impossible to overcome.

All merchandise should be classified in four separate groups, as follows:

- (a) Such as may be shipped without any obstruction.
 - (b) Such as requires investigation and may or may not require disinfection.
 - (c) Such as must be always disinfected.
 - (d) Such as is absolutely barred shipment.
- (I adopted such a classification in Hamburg in 1893, and found that

the volume of actual inspection was much reduced thereby, and also that it did away with much unnecessary disinfection which was already being done, while insuring disinfection of articles needing it.)

In railroad work, of course, having no customs manifest as an absolute check upon the honest description of goods, we must inspect everything before shipment, but will avoid countless inquiries.

Express matter should be governed by same rules as ordinary freight.

Household goods should be debarred shipment to points South unless it be possible to disinfect perfectly (generally not the case in the great press of an epidemic).

(2) *Empty freight cars going South.*—These should be swept clean, and if going only a short distance, I would advise an interior surface disinfection with 1-1000 HgCl_2 , which I did at Avondale, La., and in which manner an energetic crew with proper appliances can treat 200 cars per day at a cost of 25 cents per car.

Subsequently all ventilating windows to be left open until destination is reached, be it long or short.

Flat cars need no disinfection except such as ordinary sweeping clean will give.

(3) *Passengers from infected to Southern points.*—Passengers originating in infected towns and bound South should invariably (unless well-proved immunes) go into a camp of detention for at least eight days before being allowed to proceed. They should be under observation, if practicable, while en route to camp and before embarkation. Observation on embarkation has, in my own experience, discovered a few cases of yellow fever, and to that extent relieved the camp of some cases by their being returned to their homes or to hospitals.

No health certificates to nonimmunes should under any condition issue from any infected point, and all officers should be forbidden to give any certificate of nonexposure to infection to any person resident in a city or town resting under even a faint suspicion, for the reason that, while theoretically correct, my experience goes to show that one can not definitely determine nonexposure.

(4) *Mails for points South.*—Letters pure and simple need no disinfection. Newspapers, if originating in a very badly infected quarter, should have the usual manner of steam disinfection; otherwise not disinfected at all.

Parcels should be debarred absolutely as possible carriers of disease and involving an amount of labor to disinfect beyond the good derived from same.

If disinfection must be done, it can be and should be done in town of origin, because disinfection in town of origin economizes officers and avoids the possible infection of another point, i. e., the mail camp.

Puncture of mail should be made with a knife, which should make slits—the nail punctures close up—or, better, have properly punctured envelopes on sale.

COMMUNICATION WITH AN INFECTED TOWN.

By Surg. H. R. Carter.

It must be noted that an infected town is a source of danger to its neighbors, whether communication be allowed with it or not, because a certain amount of illicit and unwatched communication will occur, especially if the season be prolonged, no matter what is allowed. In my experience the rigid nonintercourse rule was, if to be kept up for considerable periods, less safe than carefully regulated commerce. I mean as a general rule. The object then is to formulate general rules under which commerce through and from infected places can be carried on first with the greatest safety to other communities, and second, with the least inconvenience. The measures to be taken to some extent vary from a sanitary standpoint with the degree of infection of the place and from a commercial one with the interests involved and the way these interests are involved. The problem, even considering only the risk of conveying infection, which naturally is the first consideration, is of extreme intricacy, and only a general outline to be varied in particular cases can be given here.

A.—RAILROAD TRAFFIC THROUGH AN INFECTED TOWN.

(1) *Freight*.—Freight traffic in sealed cars passing through such a town needs no regulation; it is safe.

(2) *Empties*.—The same is true of empty freight cars, but care should be taken to see that they do not contain tramps, etc. Neither freight nor empties should stop—i. e., stay in the town.

(3) *Passengers*.—Can pass through such a town by adopting the most obvious precautions—not stopping in town, not communicating with it in any way. Closing the cars is in general unnecessary, but is easy to do and is an added safeguard.

(4) *Train crews* are under the same general rules as passengers. Under some conditions they may require relay. The traffic through such a town must be under the supervision of a sanitary inspector.

(5) *Mail cars*.—To be handled like passenger coaches.

B.—RAILROAD TRAFFIC FROM AN INFECTED TOWN.

Through traffic, i. e., to points incapable of receiving yellow-fever infection, to be designated hereafter as points north, the places capable of receiving infection being designated as points south.

(1) *Freight*.—Freight of any usual kind in sealed cars can go without hindrance through to destination.

Freight cars which are ventilated passing to points north were, however, disinfected (bichloride 1-500) at New Orleans to pass through Southern territory, and I believe this to be advisable.

(2) *Empties*.—Cars, clean, need no disinfection. Box cars, clean and dry and closed, are incapable of conveying infection. If open, the same is, I believe, true, especially if not parked open in a specially infected place. They must be carefully inspected for tramps.

(3) *Mail*.—Is under the same rule as other freight, modified by the location of distributing points. Parcels other than mercantile sample packages shall be barred. It is an easy problem. Railroad mail is also to be attended to.

(4) *Passengers*.—Traffic to points north can be allowed by preventing all chance of such passengers conveying infection en route, either by themselves leaving the train, returning to points south, or by fomites; mainly their clothing.

Now, as a rule people travel in clean clothes and are well when they start. The risk from the clothes which they have on, while it exists, is not great. The risk from a case of yellow fever developing en route is practically nil if ordinary precautions be taken, as it takes some days—three is probably the minimum—for such a case to infect his environment. Besides, experience has shown that such cases seldom occur.

This traffic should be on a special train, which should not carry other passengers. A sanitary inspector must accompany this train beyond the quarantined territory, under whose absolute sanitary charge the train is, and who will prevent communication by persons or possible fomites with this territory, and carry out other sanitary regulations. It is best that these men, especially the first relay of them, be physicians and immunes. The coaches which carry these passengers must be disinfected before they come South again. Unless they stand some time in the infected town, which they should not, there is no need to disinfect them there.

Before these people are allowed to go North, we must be assured that they will remain there to cover the period of incubation of yellow fever (say ten days) or indefinitely, i. e., after frost.

Disinfection of baggage is not necessary for the latter. If, however, they will return after a time to points South, their baggage must be disinfected on departure. Indeed, if there be any reasonable doubt of

their not returning, the burden of proof being on them, disinfection of baggage must be done.

The methods by which the train inspector, on whom this work falls, assures himself (1) that a passenger intends and will stay North indefinitely, and (2) that he will stay ten days and not double back, must be worked out for each particular epidemic, and to a certain extent to each particular road and case. A good man will err by oversuspicion and hard rulings.

Train inspectors must inspect return trains returning to the infected town for those passengers returning to points South. Train inspectors must be properly relayed and the first tier of them ought to be immune. If they sleep in clean territory, they must be.

C.—LOCAL TRAFFIC, I. E., TRAFFIC TO POINTS CAPABLE OF BECOMING INFECTED BY YELLOW FEVER, I. E., POINTS SOUTH.

(1) *Freight*.—This traffic must be limited to such articles as will not convey infection, whether by nature, as railroad iron; by origin and history, as original packages in smooth metal containers, put up in clean locality or by disinfection.

(It will be further limited by what will be received.)

The division of freights promulgated by the Marine-Hospital Service this year in New Orleans, and adopted with slight modification by many State and municipal boards, is not a bad one. It was decidedly incomplete, however, and does not contain all that it could contain, either in the class requiring no disinfection or in that shipable with disinfection. Still, it contained nothing that was not strictly safe if shipped under its provisions and was found practicable and smooth in its operation. A better one can be devised after consultation with merchants, railroad men, and health officers, but it is rather an extensive job.

Express matter must be counted as freight. It is infinitely more troublesome.

Empties.—Under the same rules as in B. Box cars should be opened, not closed. If going a short distance, they may be disinfected; it is very little trouble. If a considerable one this is unnecessary. The chance of conveying infection for even a short way by a clean, dry, empty box car is minimal, if it exists.

The time they stay in the town and the locality in which parked, if parked, is to be considered.

Mail.—In general, mail can be disinfected as well in town as at a station outside of the infected district. There may possibly be occasions, however, when the latter method is preferable. I never saw one, but can conceive of them.

Newspapers have little chance to become infected, but if they do

might retain and convey it. If in large amount steam is the only practicable method.

Packages are best not allowed in the mail.

Letters do not require disinfection; the Havana mail has never been and is not now disinfected.

On the chance of envelopes containing fomites it may be judged best to disinfect letter mail, but most of such can be discovered in the necessary handling, and I believe the added safety does not compensate for the inconvenience.

The best way is to have properly perforated envelopes on sale, as at Brunswick, Ga., and to refuse all not in such envelopes, and use formaldehyde for the disinfecting agent. The ordinary punctured envelope, however, does unquestionably admit gas to its interior, and its use is efficient, though bungling. Steam is not applicable to letters.

Railroad mail must be disinfected just as any other.

Passenger traffic.—Direct passenger traffic from an infected town to points capable of receiving infection must not be allowed. Those certainly immune may go to such territory without detention after disinfection of baggage. Personal disinfection, unless in very special cases, as of those recently attending the sick or disinfecting goods or premises, is unnecessary.

The others must pass a period sufficient to cover the period of incubation of yellow fever, not exposed to any infection during this period, before being allowed to enter this territory. This is the theory of the detention camp. The details of the camp are not to be considered here.

People who have gone to points North to spend their period of incubation are in the same position as those who have been through a detention camp. The baggage of these people must be disinfected before leaving, and it is best to count the period of detention from arrival at their Northern destination, as there is a possibility (although extremely slight) of contracting fever from possible fomites on the train, just as that in camp counts from disinfection of personal wearing apparel.

Relays.—All train crews, freight and passenger, in traffic from an infected town, must be changed so as not to go into clean territory. This should be done at a place as isolated as possible, a siding rather than a station, and certainly not in a town.

Every man, mail agent, expressman, and train butcher (news agent) must make this relay, unless we know that he is going North not to return to points South, in which case he is like a through passenger.

None of the merchandise of the train, butcher, unless disinfected papers be excepted, must pass the relay. No possible fomites must pass the relay to the crew bound North, and as little communication as possible, save what is necessary for the run of the train, is allowed. The relay must be under the supervision of a sanitary officer or officers (two are generally required), whose position is one of great responsibility.

The camps for the north and south crews should be at a considerable distance from each other, and the run of trains should be arranged so as to have the crews in camp as little as possible. For passenger trains there need be no delay; for freight trains generally there must be, and their crews go in camp. There is no necessity of doubling these stations if suitable ones be chosen and they be well conducted, but conditions may be such, as on the Illinois Central and Yazoo Valley Railroad this year, where it is advisable.

These stations must be frequently and carefully inspected, and the same is true of the train inspection work.

Occasions may arise where it is necessary to guard the Southern relay camp by a number of guards, as if it were a camp of detention. It must never be allowed to become infected.

A PRÉCIS OF DETENTION CAMP MANAGEMENT.

By P. A. Surg. J. H. WHITE.

Although instructed to prepare this syllabus of detention camp management simply with a view to yellow fever, the writer has presumed to so arrange it that with slight changes it may also meet the requirements of other diseases.

Of course it would be possible to go more deeply into details in many directions, but it has been shown by the past experience of this service that competent officers do better work when furnished with outline rules rather than minute instructions. The smaller details will suggest themselves when the outline is given. The mind is able to take a comprehensive glance of the whole general plan given in outline, while if it be padded with minutiae this desirable result is in a measure prevented.

DETENTION CAMPS.

To avoid any confusion as to meaning, it may not be amiss to state that this whole article will, in the body thereof, refer entirely to camps for yellow-fever purposes, and that the necessary deviations to meet the requirements of other diseases will be treated in a final chapter.

LOCATION OF CAMPS.

In the selection of a site for a camp of detention, the general points to be considered are:

First. A healthful location, as free from malaria as may be available and a situation which has good natural drainage. The avoidance of any possibility of standing water after heavy rains is essential, because such camps are frequently to be occupied by delicate women and children, whose health and comfort are both to be watched over.

Second. A site so situated as to be easy of access by rail or steamboat and very preferably the former.

Third. One to which good water supply and a good base of food supply is easily accessible.

The camp should consist of two distinct portions: (1) main camp and (2) hospital camp. The whole establishment should be, if possible, at a distance of a mile or more from any settlement. The adjunct camp for yellow fever and intermediate hospital purposes should be at least

one-fourth mile to leeward or one-half mile to windward of this main camp.

The location should be as close to the infected place as clean territory, suitable for the purpose, can be found. It should preferably be upon a line of railway, whose distributing or dividing point outside is a small place rather than a large city. While this matter of small distributing point is not absolutely essential, it is advantageous, as enabling the easy and careful observation of the distributing point, which point is the one most likely to be attacked in the event of any accidental escape of infection from the camp.

Camp Perry, located by P. A. Surg. John Gniteras, United States Marine-Hospital Service, in 1888, on St. Marys River, where it is crossed by the Savannah, Florida and Western Railroad, about halfway between Jacksonville, Fla., and Waycross, Ga., on a slightly rolling sandy plain, which drained itself rapidly into the river, was an ideal location. It also fulfilled the above-mentioned requirement, Waycross, the distributing point, being only a village of about 3,000 inhabitants.

EQUIPMENT.

The site having been selected, the ground should be prepared by such slight ditching as may be necessary to prevent any standing water in case of heavy rains. Much ditching should be avoided on account of malaria. It is always advisable to provide the hospital camp complete before any other work is done, as it often occurs that the very first admissions bring suspected cases to light.

Experience has shown that the general outline of establishment used at Camp Perry, subsequently modified by a board of officers (Surgeon Carter and P. A. Surg. Kinyoun), is the most convenient form.

It consists of a hollow square, of which the buildings form one side and tents three. Subjoined are ground plans, which are believed to embody all the needed changes from the plans of Drs. Carter and Kinyoun. An alternative, ground plans of which are also submitted, presents itself here, viz:

A double camp, its two parts independent, except for a common executive office and kitchen (although not always feasible), presents the advantage that seldom or never will there be any suspicion attached to Camp No. 2, because, as a rule, nearly all sickness has, in our experience, developed within the first four days, and hence would be developed in the Camp No. 1. This plan of a double camp would naturally inspire in the people outside more confidence in the safety of camps, and, although not at all a sanitary necessity, may be expedient, for its moral effect alone. Such double camps should be divided, not only by guards, but by a double fence of barbed wire as well. The whole of both camps should be surrounded by a double barbed-wire fence, at least 6 feet in height, each fence to have wires 6 inches apart, from top

to bottom, and the two fences set 18 inches apart, so as to render egress in haste a matter of physical impossibility. All refugees in the main camp should be housed in tents, in order that disinfection may be easy after any suspicious case has occurred. Kitchen and dining rooms should be arranged so as to involve a minimum of time and labor in serving meals, and with capacity in the latter for seating the whole number of refugees at one time. For purposes of good discipline, there should be provided separate tables for subaltern officers, such as commissary, quartermaster, clerks, et al., in order that they may the better preserve their proper authority over attendants; officers of the guard may be included in the list of such officers, or the whole guard messed together, according to circumstances. It is not at all advisable that the guard, however, should mess with the lower grade of attendants, as the responsible nature of guard duty is *prima facie* evidence of the necessity for a better class of men for these important posts, and they should therefore be separated when possible.

In addition to the privies located on the plans there may be necessity for providing a few, more convenient of access, for delicate women, and these should by all means be dry earth closets located in a tent, and daily emptied. The locations indicated in the plan should not be considered as essential, but should be varied to avoid contamination of the water supply or for other sanitary reasons.

If not already existent, a sufficient amount of railroad siding should be provided to hold the necessary cars for disinfection and commissary purposes. At a point most convenient for this purpose on this siding there should be built a waiting and dressing pavilion, containing from four to six rooms, to be used for the purpose hereinbefore mentioned, and from four to six tents, end to end, for examination, reception, and registration of applicants for admission.

In case it be deemed advisable to use the double camp heretofore recommended, the only necessary change in the plan submitted, and labeled "Exhibit A" will be the placing of the buildings laid down on said plan exactly in the center of the quadrangular open space and the running of a barbed-wire fence through the middle of the camp from side to side, in such manner that the line occupied by said fence shall bisect the site of the surgeon's office, the telegraph office, the kitchen, and the commissary.

It will also be necessary to provide in this case an additional quartermaster's storeroom unless the existing storeroom is also placed upon the middle line, which can in fact be done by making one building serve for quartermaster's and commissary's work.

It is believed that there will be no necessity for changing the entrance to camp in the substitution of a double for a single camp. Should such change, however, be considered necessary, it may be readily accomplished by leaving out a sufficient number of tents from the camp on the side next to the surgeon's office to provide a 50-foot avenue from the

surgeon's office to the outside and running the wire fence in this case, so far as it concerns that portion fronting the surgeon's office, as two fences, one being on either side of the aforesaid avenue.

FOOD AND WATER SUPPLIES.

* If pure water can be obtained by pumping or carrying from a neighboring stream, such supply is preferred, and only when this is unavailable should resort to driven wells be had. In case neither of the above supplies are available, water should be brought in railroad water cars from some reliable source; and in very porous soils, where water is near the surface, the driven-well supply should be a dernier resort, as it is manifest that in a small territory the dejecta from 1,000 persons, no matter how carefully removed, must to some extent poison such water.

The food supply should come by preference from a noninfected city or town, but in some cases, as at Camp Fontainbleau, in 1897, it is absolutely impossible to do otherwise than obtain supplies from an infected center. In such cases all containers must be either at once burned or disinfected, preferably burned. Sawdust, paper, cloth, etc., so used should be burned at once.

PERSONNEL.

In addition to the commanding officer, the medical staff, and the hospital steward, the necessary personnel of a detention camp should be:

(A) Guards, who should be placed at intervals, long or short, according to the topography of the site, and be under officers to be named hereafter.

(B) Disinfecting force.

(C) Quartermaster, commissary, clerks, bugler, telegraph operator.

(D) Cooks, waiters, laundresses, scavengers, teamsters.

ROUTINE, DISCIPLINE, ETC.

The commandant should make frequent day inspections of camp and guard lines, and occasional night visits to the latter; visit at frequent intervals all parts of the camp, and in general so inform himself as to be capable of deciding, in large measure from his own knowledge, the complaints brought before him. He should see without exception all cases of sickness, however trivial, reported by the inspectors, and himself decide whether suspicious or not. He should not confine himself, however, to routine inspections, but leave such to his assistants. He should keep careful watch against possible bad food or polluted water as tending to create sickness which may simulate yellow fever and confuse diagnosis. The assistant medical staff, consisting of one or more inspectors, in proportion to the size of camp, one resident physician for the hospital, and one doctor or chemist as chief disinfecter, should each and all report directly to the commanding officer. A double daily

inspection at 9 a. m. and 4.30 p. m. is absolutely essential for the discovery in their incipency of suspicious cases and should include each and every soul in camp—guests, officers, and employees—and in the event of there being any resident population near the camp, even though a quarter mile distant, these also should be inspected at intervals of a few days. The duties of the steward should consist in the supervision of the classes stated in article on personnel, sections C and D, the buying of rations, supervision of accounts, and other such duties as by the regulations of the Marine-Hospital Service appertain to his office.

SANITARY POLICING OF THE CAMP.

All refuse should be removed each day from all streets and tents, and promptly burned. All privies should be daily scrubbed clean, and the dejecta covered thickly with a mixture of copperas and lime, which is an excellent deodorant. Dejecta should be carted away and buried every week. Kitchen garbage, very apt to accumulate, can best be disposed of to pigs outside the camp, or failing this, be buried also outside the camp. A special force of one or more scavengers, in proportion to size of camp, must be detailed for this work of cleansing camp, and the steward should exercise most careful supervision over their work.

Especial care should be used to detect and prevent the commission of nuisances in the camp streets at night, a thing which is extremely difficult to compass, on account of the hoodlum element often present. A liberal use of the guardhouse with a diet of bread and water is the best remedy, but even this is not absolutely effective.

As an adjuvant to the thorough cleansing of camps and the disinfection of grounds, it is advisable to provide one or more of the furnaces used by the paving companies in melting asphaltum. These furnaces may be used to sear the ground under and around a tent, which has become infected, and even for destruction of dejecta removed from privies.

HOSPITAL.

The hospital camp, as before stated, should be at a distance from the main camp and under the same isolation from outside communication. It should consist of, preferably, 8 small wooden buildings and about 12 tents, namely, 4 hospitals capable of containing 2 patients each, 1 kitchen and storeroom, 1 small house for resident physician, and 2 small privies, 6 tents for suspects at a distance of 100 yards to windward of the hospital tents, and from 4 to 6 tents for guards and attendants. The whole camp should be surrounded by a double barbed-wire fence, as in the main camp, and under guard night and day. Communication should be carried on with the main camp by only two means: (1) A telephone, when obtainable; (2) a wagon for supplies and for ambulance purposes, which wagon should be driven by an immune and sprayed with bichloride of mercury solution (1–2,000) whenever used for

any infectious material. The grounds of this camp should be policed with the same thoroughness as the main camp. An outer guard should patrol this camp and allow no person within 200 yards of the wire fence surrounding it, and especially to leeward of it.

An endeavor should be made to prevent the infection of the hospitals themselves or at least to minimize such infection. This end may be best attained by the immediate disinfection of all articles of clothing and bedding as fast as such are removed from the persons of patients, and by the admission of fresh air and sunshine to the hospitals whenever the weather will permit. All dejecta must be disinfected, as soon as passed. All disinfections to be done as provided in the quarantine regulations of the United States Treasury Department.

It is imperatively necessary to prevent the infection of the tents used as an intermediate camp or hospital for merely suspicious cases, and to this end all such tents should, in addition to the precautions named above, be washed down with 1-2000 solution of bichloride of mercury after each occupancy, and the floors removed and ground beneath and around them burned by a Barber asphalt furnace, the floors to be wetted on both sides with 1-1000 solution of bichloride of mercury. If all this is done promptly and thoroughly, this most important part of the camp may be kept free from infection indefinitely.

Nurses and other attendants attached to this intermediate hospital should be immune, for it must be borne in mind that these patients are all at least suspicious, and many of them may ultimately find their way into the yellow-fever hospital near by. It goes, therefore, without further saying, that all officers, guards, nurses, and attendants in hospital or intermediate camp must or should be immune to the disease treated in these camps. There should, however, be no mingling allowed between these two hospitals for fear of infecting some suspect who really has not yellow fever. All cases which have been positively diagnosed should be removed at the earliest possible moment to hospital if yellow fever, or to camp if not.

RECEPTION AND TREATMENT OF GUESTS.

All persons seeking admission to a camp should be given a permit by some responsible agent in the infected center, and such permits in any one day should in no case equal more than one-eighth of the total capacity of the camp. Upon the arrival of a refugee at camp he should be at once examined as to his health by one of the inspecting officers detailed for that purpose, and if found not to be suffering from any suspicious disease he may be registered. He should then turn in his effects for disinfection and await in a building provided for this purpose the return of his disinfected belongings. He should then change his clothing and submit for disinfection the suit worn upon arrival. This being completed, he may finally be admitted to the main camp, and no further disinfection required, unless he subsequently develop

disease in his own person. It is advisable that invariable rules should obtain in all camps, and, as nearly as may be, all persons treated exactly alike and concessions made to none.

The hours for rising in the morning, for meals, for inspections, for retiring, and for lights out should be sounded by a bugler at set hours each day. At inspection each and all guests should present themselves at the front of their tents, and be required to remain there until the completion of the inspection, thus avoiding the confusion incident to their being allowed to move about after being themselves inspected, with the consequent result that one man is inspected twice and another not at all. No sickness can be considered too trivial for a careful investigation, and any case presenting symptoms in the faintest degree suspicious should be at once isolated. The attention of the commanding officer should be called at once to all cases.

SUBALTERN OFFICERS AND EMPLOYEES.

All employees other than guards and disinfectors should report directly to the steward, if in marine-hospital camp, or to the corresponding official in other camps. These should be (1) a quartermaster, whose duties are to provide outfits for each tent or building, to see to the keeping of the same in repair, and to prevent the abuse or theft of property; (2) a commissary, to receive and issue stores and keep the records appertaining thereto, and to perform such other duties as the steward may direct; (3) a sufficient number of clerks to keep record of entry and discharge of guests and their belongings; (4) a telegraph operator; (5) necessary cooks, laundresses, waiters, and scavengers in proportion to the number of occupants of the camp.

The disinfecting force should be under the charge of a competent and experienced man, preferably a physician or chemist, and the number of his assistants sufficient to handle all the effects of guests promptly and carefully.

The guard should consist of from 25 to 40 men, who should be selected with the greatest care possible, as on their fidelity and courage depends more than on any other force, the successful issue of the camp. It is advisable to select first two sergeants for night and day duty respectively, and ultimately as the men become better known to the commanding officer, four more, and finally from these six, the captains of the guard, the permanent officers for night and day command can be carefully selected. The guard should be divided into watches of preferably eight hours' duration, though the length of the watch may well be either four or six hours. They should patrol the outer line of the camps night and day, allowing no one to pass in or out, who can not give the proper countersign. The countersign should each day be provided by the commanding officer. In addition to outside patrol, guards should patrol the avenues, between tents, during the night to prevent noises or nuisances. All guards should report to the captain of their respective

watches, and the captains to the commanding officer, anything unusual occurring under their observation.

ADJUSTMENT TO DISEASES OTHER THAN YELLOW FEVER.

In the application of the foregoing chapters to the management of a camp for cholera or smallpox, the changes to be made are as follows:

For cholera, the food and water supply must without exception come from an absolutely noninfected locality, and no possible variation can be made from this rule. The camp need not be so far from the nearest settlement, and greater pains must be taken to disinfect or destroy dejecta. The period of incubation being short, the detention after last possible infection need be only for five days.

For smallpox, the food and water supply demand no greater attention than in yellow fever. The camp need not be at any great distance from the nearest settlement. The dejecta disinfection is of no moment except as to general sanitation. The period of incubation demands at least fourteen days' detention.

SUGGESTIONS AS TO BUILDINGS, LIGHTING, AND HEATING.

Buildings are most quickly constructed with perpendicular rough planking for weatherboarding, covering cracks with 1 by 3 inch strips and roofed with tarred paper. These buildings are generally for summer use and therefore such construction is ordinarily sufficiently weather-proof. Should heat be necessary, stoves may be used with ease. It is advisable to elevate all buildings on blocks, to a sufficient height to allow free circulation beneath. Wire netting may be stretched around the base of buildings to keep out animals and refuse.

Posts should be provided for lamps at regular intervals, to light the camp streets. These lights, preferably regular kerosene-burning street lamps, serve a good purpose in preventing nuisances at night by creating publicity.

It sometimes becomes necessary to provide heat, even in a camp for yellow fever, and in such case it is well to build a large shelter with an opening in the center of the roof. Open fires may be lighted under this opening for the comfort of guests.

All such fires should be in the central portions of the grounds, and no fire allowed in the camp streets under any conditions, as such fires are very likely to result in destruction of the camp.

DISINFECTION (ADOPTED FROM REGULATIONS).

The following methods of disinfection are considered efficient:

FOR YELLOW FEVER.

(1) Apartments or dwellings infected with yellow fever to be disinfected by one or more of the following methods:

(a) By a thorough washing of all surfaces of apartments with an efficient germicidal solution.

(b) By sulphur dioxide for twenty-four hours' exposure, 4 pounds of sulphur for each 1,000 cubic feet, plus due allowance made for waste.

(c) By formaldehyde gas in not less than a 4 per cent per volume strength, and not less than six hours' exposure.

NOTE.—One liter of 40 per cent solution of formaldehyde gas will evolve about 1,425 liters (50.1 cubic feet) of gas at 20° C. (68 F.).

(2) Grounds, outbuildings, etc., deemed to be infected, to be disinfected with a strong solution of crude carbolic acid (carbolic acid, crude, 2 parts; sulphuric acid, 1 part; water, 25 parts) or an acid solution of bichloride of mercury (1–500); disinfection of ground preferably by fire.

(3) Bedding, wearing apparel, carpets, upholstered furniture, and the like to be disinfected by one or more of the following methods:

(a) By steam at a temperature of 100° to 102° C., thirty minutes' exposure.

(b) By boiling, all parts of the articles to be submerged.

(c) By saturation in an efficient germicidal solution.

(d) By thoroughly wetting the surfaces of articles with a 40 per cent aqueous solution of formaldehyde, and placing them in a closed space for not less than twelve hours.

(e) Where surface disinfection is required, formaldehyde gas of not less than a 4 per cent per volume strength and not less than six hours' exposure, or by sulphur dioxide for not less than twenty-four hours.

(4) The dejecta from cases of yellow fever to be disinfected by an efficient germicidal solution.

Mails to be disinfected by one of the following methods:

(a) By formaldehyde.

(b) By sulphur dioxide.

(c) By steam.

(Newspapers must be made up in such packages as shall be penetrable to the disinfectant used.)

FOR CHOLERA.

(1) Dejecta and vomited matters of cholera patients shall be received into vessels containing an acid solution of bichloride of mercury (bichloride of mercury, 1 part; hydrochloric acid, 2 parts; water, 1,000 parts), or other efficient germicidal agents of equal value.

(2) Bedding, clothing, and wearing apparel soiled by discharges of cholera patients, or used by them or in their care or treatment, shall be disinfected by one or more of the following methods:

(a) By steam at a temperature of 100–102 C., thirty minutes' exposure.

(b) By boiling, all parts of the articles to be submerged.

(c) By saturation with an efficient germicidal solution.

(3) Woodwork or furniture contaminated by cholera discharges shall be disinfected by thorough washing with an efficient germicidal solution.

(4) Clothing and personal effects suspected of being infected with cholera shall be disinfected by one or more of the following methods:

- (a) By steam at 100° to 102° C., thirty minutes' exposure.
- (b) By boiling, all parts of the articles to be submerged.
- (c) By saturation with an efficient germicidal solution.

(d) By wetting all surfaces of the suspected article with an aqueous solution of formaldehyde gas, and placing it in a closed space for not less than twelve hours. Containers may be disinfected by wetting all surfaces with an efficient germicidal solution and allowing it to dry.

Where only surface disinfection is required:

(e) By formaldehyde gas in not less than 4 per cent per volume strength and not less than six hours' exposure.

(5) Apartments known to be, or suspected of being, infected with cholera shall be disinfected.

(a) Washing all surfaces with an efficient germicidal solution.

(b) By formaldehyde gas in not less than 4 per cent per volume strength, and for not less than six hours' exposure.

FOR SMALLPOX.

(1) Apartments infected with smallpox shall be disinfected by one or more of the following methods:

(a) By exposure to sulphur dioxide for twenty-four hours, 4 pounds of sulphur for each 1,000 cubic feet, plus due allowance made for waste.

(b) By exposure to formaldehyde gas in not less than 4 per cent per volume strength, and for not less than six hours' exposure.

(c) Washing all the surfaces of the apartment with a solution of an efficient germicide.

(2) Clothing, bedding, carpets, articles of furniture and the like, exposed to the infection of smallpox, to be disinfected by one or more of the following methods:

(a) By exposure to steam at a temperature of 100° to 102° C. thirty minutes.

(b) By boiling, the articles to be completely submerged.

(c) By saturation with an efficient germicidal solution.

(d) By thoroughly wetting the surfaces of the article with a 40 per cent aqueous solution of formaldehyde, and confining it in a closed space for not less than twelve hours.

(e) By exposure to formaldehyde gas in not less than 4 per cent per volume strength, and not less than six hours' exposure.

(f) By exposure to sulphur dioxide for twenty-four hours.

MISCELLANEOUS.

Articles injured by steam, such as rubber, leather and containers, to which disinfection by steam is inapplicable, to be disinfected:

(a) By thoroughly wetting all surfaces with an efficient germicidal solution, the articles being allowed to dry.

- (b) By exposure to sulphur dioxide.
- (c) By exposure to formaldehyde gas.

The application of gaseous disinfection to these articles should be made in a closed space, air-tight, or as nearly so as possible.

The following are considered efficient germicides:

- (1) Bichloride of mercury acid, 1-1000.
- (2) Carbolic acid, pure, 5 per cent solution.
- (3) Trikresol, 2 per cent solution.
- (4) Solution of formaldehyde, 1-500 (which is 1 part of a 40 per cent solution of formaldehyde to 199 parts of water).
- (5) Solutions of hypochlorite of calcium (chloride of lime).

CAMPS OF OBSERVATION.

Inasmuch as it often becomes necessary to remove from trains or other vehicles while still within infectible territory certain persons not properly vouched for, it is probably advisable to establish camps at State lines, on railway routes, or at other strategic points.

Such camps are nothing more nor less than small detention camps, with a capacity for 25 to 50 occupants, and should be conducted on the same lines as detention camps. It will not be necessary, as a rule, to establish such camps, and never except at such points as are at too great distance from the regular detention camp for easy access, or too far from noninfectible territory to allow of transportation to such territory of the suspected persons.

TRAIN-INSPECTION SERVICE.

By P. A. Surg. G. B. YOUNG.

PREAMBLE.

In conducting a system of train inspection for the purpose of preventing the spread of disease and of facilitating intercourse and trade as far as is consistent with safety, it is most important to always keep in mind that the limitation of the spread of the disease should be paramount to every other consideration, the facilitating of traffic being of only secondary importance.

I lay stress upon this because my own experience has taught me that it is often difficult to maintain the proper point of view in the face of the senseless and vexatious oppositions of local origin that often upset one's carefully considered plans. One is apt to become absorbed in the task of opening lines, moving trains, and the like unless careful to remember that such things, while unquestionably of great importance for the public good, are not the most important part of the work.

RELATIVE IMPORTANCE OF QUARANTINE AND TRAFFIC.

I do not mean to belittle the importance of opening up traffic, however, for the suffering and loss that accompany the interruption of trade and travel during the presence of yellow fever, and the resulting local quarantines, are among the most dreadful consequences of the scourge.

Next to preventing the actual spread of the disease the most important thing to do is to strive to minimize the distress that the fear of its coming brings to all within the threatened territory.

In conducting a system of train inspection, then, our first duty is to facilitate in all proper ways the escape from infected places into non-infectible territory of those who desire to go; second, to supervise the movement from place to place in infectible, but clean territory, of those whose necessities compel them to travel; and, finally, to do what we can toward keeping open the channels of trade.

Let us consider the principles that should govern our action in securing each of these several ends, and then take up, somewhat in detail, the methods to be followed in maintaining these principles.

Under the first head, then, the rule can be laid down that all persons can be permitted to leave infected for noninfectible territory if a rea-

sonable certainty can be secured that they will not return into infectible territory before the expiration of ten days from the last possible exposure to infection, which, however, may be and often is a very different thing from ten days since their departure from an infected place; but that this movement must be so conducted that no danger results to the territory through which they pass en route.

ALL PERSONS MUST GIVE SANITARY HISTORY OF THEMSELVES.

Under the second head the fundamental principle is that only those should be permitted to travel who can give a good sanitary history; and that while en route they shall be preserved from contact with any infected or suspected person, place, or thing.

Given the observance of these principles as to *both persons and things* and the opening of the channels of trade would seem to follow as a natural corollary, but on account of the peculiar conditions which arise under local quarantines it does not naturally do so.

For the proper opening of trade it is necessary, first to secure the confidence of the various local authorities and, second, to maintain sanitary control of the transfer and junction points, the "strategic points" in our sanitary campaign.

FORMULATION OF DETAILED RULES AND DESIGNATIONS FOR CLASSES OF PERSONS AND THINGS.

An attempt will now be made to formulate somewhat detailed rules for the conduct of a system of train-inspection service.

For the purpose of brevity the name "suspects" will be applied to persons from infected territory and that of "passengers" to those from uninfected territory.

Where mail, freight, or express cars are referred to they will be called "cars," passenger cars being spoken of as "coaches."

"Train crew" will refer to all persons employed on the train in any capacity, except that in some instances, to be noted at the time, the Pullman conductor and porter are treated as belonging to a slightly different class.

PASSENGER TRAFFIC FROM OR THROUGH INFECTED TERRITORY.

I. THE PREPARATION AND HANDLING OF TRAINS.

(a) Where the trains are made up in infected territory and subsequently run through clean territory.

CLASS OF COACHES PREFERRED.

Wherever possible, the coaches used in conveying passengers from or through infected territory should be of the kind equipped with cane seats. These are much less apt to become infected and are much easier

to clean. No matting should be allowed in the central aisle and, as far as possible, all curtains and hangings should be prohibited.

WHERE TO DISINFECT COACHES.

Wherever possible, coaches used for carrying suspects should be disinfected at the ends of their runs, i. e., in clean territory.

This disinfection can be done by the employees of the road, but should be under the supervision of a sanitary inspector, who should be informed by wire on the departure of each train from the infected place of the numbers of the suspect coaches, and after disinfection the coaches should be placarded with the date of disinfection and the signature of the inspector.

RETURN OF COACHES EMPTY.

Where this can not be done the coaches should be locked and returned to the infected place and disinfected there.

Indeed, in some cases it will be best to return the coaches empty, even after disinfecting, for if the territory traversed is badly panic-stricken it will greatly help in alleviating the anxiety of the passengers if they know they are in no danger of being put into coaches recently vacated by suspects.

In this, as in many other things, it is often advisable to concede something to popular prejudice, so long as efficiency does not suffer thereby, or too great a multiplication of regulations does not result.

OBSTACLES TO RETURNING EMPTY NONDISINFECTED COACHES.

Theoretically it would be proper to lock these coaches and attach them to the rear of the train while returning them to the infected territory, so that the train crew could move freely about from car to car of the coaches in use without entering the reserved cars, but practically this presents many difficulties. Railroad men, like other men to whom the established routine has all the force of law, are exceedingly adverse to changing their methods or habits, and while we should, if necessary, utterly disregard their preconceived ideas of what should be done, we should at the same time avoid imposing rules that, while correct in the abstract, do not involve a vital necessity.

It is to be understood that I am referring above to lines on which the cars go through to points beyond the danger line, the case of branches and of local lines on which the coaches stand over in the infectible territory is somewhat different. Here, while the danger is very slight, we can not say positively that it does not exist, so it is best to have these cars disinfected at their lay-over places, if it can be done without causing alarm. I think it will be found, however, that the disinfection of cars at a small junction point, or even in a small city, will tend to make people uneasy, and possibly lead to the exclusion of trains. From an administrative point of view it is easier to disinfect

at the infected place, because there we will be doing a great deal of similar work and will have the plant and force for the purpose, and, moreover, the men on the outside would be relieved from keeping up disinfection work at a number of points, the number rapidly increasing as the distance from the infected place becomes greater.

PULLMAN SLEEPING CARS.

Sleeping cars are in a different class from day coaches and need different treatment. In one sense they are more apt to get infected, as they are much harder to clean, contain much more infectible material, and moreover, being occupied at night on at least half the trains, they are very much more apt to have cases of fever develop in them.

On the other hand, they are more carefully looked after than the other coaches and are practically always "through" to noninfectible territory. Sleepers are very difficult and troublesome things to disinfect. The best thing to do with them usually is to require that a sleeper that has made a trip into an infected place shall not be returned into infectible territory until, say, ten days have elapsed—amply sufficient to make them safe.

SLEEPING CARS TO BE REGISTERED AND WATCHED.

A register should be kept at the infected place of all sleepers leaving it, in order to prevent them being sent out over one line and returned over another.

DISINFECTION OF BAGGAGE, MAIL, AND EXPRESS CARS.

Baggage, mail, and express cars should be disinfected immediately prior to their departure from the infected place, because, as they are to receive only disinfected baggage, mail, and express, and will be occupied after traversing the short distance to the relay station by clean crews, they are not a source of danger to the places at which they may lie over.

SOME BAGGAGE TO HAVE CONTAINERS DISINFECTED.

The only flaw in this is when undisinfected baggage "for points in noninfectible territory, there to remain," is being handled, and this can be met by disinfecting the outside of the containers. We now come to the consideration of the handling of the trains as a whole.

REFUGEE TRAINS BEST RUN THROUGH TO NONINFECTIBLE TERRITORY.

Unquestionably, where it is possible, and it will seldom be impossible, the trains bearing refugees should run through without making

any stops except for coal and water. The refugee train can run as a section of the regular train, and thus disarrange the routine of the road's business as little as possible.

In the very few cases where this is impracticable the coaches and baggage cars used for refugees and their baggage should be absolutely reserved from other passengers and baggage. This does not necessarily apply to the express and mail cars, since they have been disinfected and receive only disinfected material, whereas the baggage cars may contain baggage "for noninfectible territory, there to remain," that has not been disinfected.

TRAIN CREW.

The entire train crew should be changed at the relay station to be described hereafter. This applies to conductor, brakemen, engine crew, baggage man, express messengers and mail clerks.

As the relay station is only a short distance from the point of departure, this need not seriously interfere with the handling of mail and express. The Pullman crew is best relayed too, but if the terminus of their run is far outside of the danger line they may be treated as indicated for the Pullman coaches—allowed to proceed, but not allowed to come back. This was the method followed to some extent last fall on the New Orleans-Chicago run, and as far as I am aware no trouble arose from it. The train boy must either be suppressed or else made to lie over outside of infected territory, and prohibited from drawing any supplies therefrom.

"SHUTTLE" TRAINS.

A method which I followed to some extent at Memphis in 1897, and which presents some administrative advantages over the one just outlined, is to have the refugee train made up at the relay station, and then run a "shuttle train" back and forth between the infected train and the relay station, transferring everything there to clean cars and coaches.

This works especially well when the distance between infected and noninfectible territory is short, as was the case between Memphis and middle Tennessee.

ADVANTAGES GAINED BY "SHUTTLE" TRAINS.

One possible advantage in this method is that the officer in charge of the inspection service can have direct control of all the inspectors and follow their work from the beginning of their runs, while otherwise the first tier of them has of necessity to report to the officer in the infected place, thus increasing his responsibility and labors, and at the same time causing a division of authority that might diminish the effectiveness of the service.

WHERE SECTIONS ARE TO BE MADE UP.

Which ever method is adopted, the section which is to do the local business in neutral or clean territory must be made up either at the relay station or, which is preferable, further out.

When separate trains are not used the refugee coaches are handled precisely as if they made up a separate train.

(b) When trains originate in infected territory and subsequently run through other infected territory, separated by zones of clean territory.

The way to meet this is to have the suspect section make all the infected stops, while the clean section makes the others. Should one of the infected places happen to be an important junction point great difficulties may arise. In such cases, however, it will usually be possible to arrange an immediate transfer, but how this is to be done, as well as the methods to be pursued when only separate coaches are used for suspects, come more directly under the head of actual inspection work and will be treated in that connection.

(c) When trains originate in clean territory and pass through infected places.

In this case the mechanism is simpler, it being understood, of course, that I am referring to places of too small size to justify the running of refugee trains, or so situated that it is impracticable. This latter condition will sometimes occur on account of the difficulty in securing a site for relay stations.

TRAIN SHOULD NOT STOP IN THE INFECTED TOWN.

The train should not stop at the infected place, but should pick up the refugee coaches at some point outside the town, even if only a few hundred yards, and the necessary couplings and setting of switches must be done by employes other than the train crew.

ARRANGEMENTS FOR SMALL PLACES.

For the use of small places or of larger places similarly situated, a combination coach and baggage car should be provided, and this coach, as in all "special coach" methods, should be attached to the rear of the train.

ARRANGEMENTS FOR LARGE PLACES.

If the place is of considerable size, so that the train has to reduce speed very much in running through it, there is always a danger of tramps and others boarding the train while in motion; consequently, in such cases, we must have the train stopped at designated points on either side of the town while a search is made for such intruders.

(d) Lines running entirely through clean territory but connecting with lines from or through infected places.

A conspicuous instance of this class in the fall of 1897 was the Memphis and Charleston Railroad. Running from Memphis to Chattanooga, it was cut at intervals by all the lines from the South. We accordingly had to cover it from end to end to prevent our flanks from being turned.

PASSENGERS FROM COLLATERAL AND CROSS LINES.

The "side drift" along such lines does not usually amount to very much, and all that is needed is such control that we can be sure that no one actually sick boards the train, and that all the trains are under such supervision as to prevent suspects from disembarking in infectible territory. As all the lines from suspected or infected territory are to be under guard, the chances of any harm coming from travel along these cross lines is very slight.

REASONS FOR INSPECTING CROSS LINES.

The main reason for inspecting these cross lines is that by so doing we can keep all the possible lines of travel under supervision, or at least control the travel, without actually inspecting every train. In the territory near the Alabama-Mississippi-Tennessee line, for example, there are a number of short branches which connect points in the two former States with points in the latter; but none of them extend south of the Kansas City, Memphis and Birmingham, very few of them south of the Memphis and Charleston. In 1897 we did not patrol these lines because the patrol on the east and west lines made it impossible that anyone could reach the north and south branches.

There is nothing particular to be said about the crews of trains of these last two classes, except that of course they should not be changed at an infected place.

II. RELAY STATIONS.

These are the points at which the crews of trains coming from infected places are changed.

This is usually done only when the infected place is the starting point of the train, as in the case of New Orleans or Mobile, or where the infected zone lies along a definite section of road near the starting point, as along the coast of Mississippi Sound.

BEST SITUATION FOR RELAY STATIONS.

The relay station had best be at an isolated siding—should be there, in fact—but if this is not possible, then the most readily isolated station should be chosen. The distance from the infected place depends upon circumstances. Facility for isolation and control is a more important factor than distance from point of departure.

Wherever situated, the relay station must be under absolute control,

and an inspector should be on duty night and day, with sufficient guards always at hand to enforce his orders.

The ideal condition is to have the relay made at the meeting point of the in and out trains, the crews simply exchanging trains; but this is seldom possible.

ALTERNATIVE METHODS.

There remain two other methods. In one the crew of the out train lays over at the relay camp to take in the next incoming train; in the other the main train is made up at the relay camp and there is a "shuttle train" that runs back and forth between the infected place and the relay station. As already stated, the latter method is far and away the best. It simplifies the administration of all the work—of trains, crews, and all. The disinfected mail, express, and baggage are transferred to the clean cars and handled by clean crews. All persons are also transferred to clean coaches, and in this way all the difficulty about Pullmans, etc., is avoided. If the trains are disinfected under this method, it can be readily done at the relay station.

RELAY CAMPS.

At such a relay there should be a camp for the train crews, and the inspector should have absolute control of it. The camp should be arranged in an orderly manner. It should be carefully policed, and all possible pains taken to keep it in good sanitary condition.

As this camp must necessarily be in "neutral territory," the greatest care must be taken to prevent any infection of either the camp or the surrounding country. No amount of pains is too great to take to prevent the infection of the camp.

If the relay is, as it should be, at an isolated siding, it may not be necessary to guard the camp; otherwise it should be closely guarded. Railroad men are especially intolerant of restraint, so there must be a clear understanding with the officials of the road that any disobedience of the inspector's orders means dismissal. This and the exercise of a little judgment at the start will soon get things to running satisfactorily.

CIRCUMSTANCES INCREASE DIFFICULTIES.

Should the circumstances compel the adoption of the method in which the out crew lays over to take the incoming train back to town, the difficulty will be vastly increased. It will then be best to have two camps, with attendant doubling of the guards, as it is necessary to prevent not only communication between the crews but communication between the inner crew and the country. In operating under this method the in crew brings the train to a stop at a point between the two camps and leaves it there and returns to its camp, while the outer crew then boards the train and takes charge of it. For incoming trains the process is reversed.

In one case I did about the same thing near Memphis, by stationing a caboose at a way siding and designating a point some half mile away as the transfer point. A switch engine preceded the train and took siding at the transfer point. When the train came in sight, the "outside" crew walked down to the transfer point and boarded the train, while the inside crew boarded the switch engine and returned to the city.

A QUARTERS TRAIN IS ADVANTAGEOUS.

If there is sufficient siding room a "quarters train" offers some advantages over a camp, especially in that if it gets infected, or is suspected, we can move it bodily to uninfected territory and get rid of watching a fresh focus, and can then replace it with a clean train and crew and continue business at the old stand.

TRANSCERENCE OF FOMITES A GRAVE DANGER.

The greatest care must be taken to prevent the transference of possible fomites from the infected place to the relay station, and all transfers of passengers and crews should be under the personal supervision of the inspector.

HOSPITAL CAR OR ISOLATION TENT.

At all relay camps either a hospital car or an isolated tent should be provided for the care of any sick suspects that may turn up. A box car is the best; and another car should be at hand with an autoclave and supply of formaline for disinfecting purposes; this latter car should be without end windows, should be provided with racks of wire netting, have one door sealed and the other fitted with a canvas or rubber gasket, and have connections fitted through door so as to admit of the use of either formaldehyde or steam from a locomotive.

III. MANAGEMENT OF INSPECTIONS.

ORGANIZATION AT INSIDE END.

Necessarily the inner end of any system of inspection from infected to clean territory must be in different hands from the outer end and the organization of it is embraced in the management of the local work, and as such need not be especially described here beyond what has already been said. How far the jurisdiction of the inside man should extend depends on how far the relay is from the infected place, and more especially on how it is operated.

If a "shuttle train" is used the care of the relay should be in the hands of the outside man. If an exchange of trains is made this should also be the case, but if the crews both lay over it is best for the inside man to have charge. If there are two camps the line may be drawn midway between the camps.

ORGANIZATION ON THE OUTSIDE.

This much being settled, we come to the organization of the outside territory. As the country in which we are to operate is practically confined to the extreme Southern States, with the addition of western Tennessee and Arkansas, it is possible to study it in advance and get a clear idea of the routes of travel, junction points, and the like.

The scope of this article does not admit of going into the question of train connections, meeting points, etc. Everyone in charge of such work must work out the details for himself, and he will be apt to find it a troublesome job, but the main points of the work may be glanced at, as they play a considerable part in shaping the plan of organization.

STRATEGIC DIVISION OF TERRITORY.

Looking at the map, then, it will be seen that the roads in the "infectible territory" naturally arrange themselves into three groups. This is exclusive of the roads west of the Mississippi, especially of those in Texas. One group radiates from Memphis and Fulton, Ky., and may be called the western group, another occupies the center of the field with Nashville as a base, and the remaining group is made up of the lines converging on Atlanta and Chattanooga.

PROPER DIVISIONS FACILITATE THE WORK.

This arrangement facilitates the division of the work, but I am strongly of the opinion that the whole territory should be under one man. In no other way can the unity of control be maintained. We have to start off by dividing authority to some extent with the inside man, and further division increases the chance of confusion in a geometrical progression. It is a large territory of course, but I managed to cover about three-fourths of it fairly well last fall, and if a sufficient number of regular officers were supplied to take the subordinate divisions of the territory it would be much easier.

TERRITORY WEST OF THE MISSISSIPPI.

The territory west of the Mississippi should be divided. Arkansas naturally falls into the Memphis district for the most part, but Louisiana and Texas should be separate jurisdictions. The headquarters for the former should be at Shreveport and for the latter at Houston and Texarkana.

TERRITORY EAST OF MISSISSIPPI RIVER.

Assuming then that the work east of the Mississippi is to be under one head, he should have an officer to assign to the charge of each of the main divisions, with as many regular officers as possible under them and a sufficient corps of acting assistants and inspectors.

The Memphis section being the most important, the general headquarters should be there. Of course these remarks are based on the supposition that it is the Southwest that is infected. If it is in some other section that the work is to be done the geographical remarks just made will not apply, but the general plan of organization will be applicable anywhere.

The headquarters should be adequately provided with clerical and other assistance.

It is idle to try to run a large inspection service without adequate office force. I tried to do so on the ground of economy, but it cost more than it came to. Whoever takes charge of such work will find that the impression in the minds of the general public is that "all knowledge and all power" have been intrusted to the "marine doctor," and that as a consequence he will be approached by hundreds of people with whose business he has no direct concern, yet whom he must either see or have someone see for him, and whose numberless letters of inquiry must be answered.

ARRANGE WITH HEADS OF RAILROADS AT FIRST.

Arrangements must be made with all the roads in the territory to furnish transportation for all officers and inspectors, and to issue orders to all employees that the train inspectors are in absolute control of all sanitary matters on trains and that their orders must be obeyed to the letter.

Provided one goes to the head officers to make arrangements he will find it a pretty general rule that the larger the corporation the more intelligent will be its cooperation in his work.

A clear understanding must be promptly reached with the express companies and with the superintendent of the Railway Mail Service and with the Pullman Company as to just what you want them to do. In all such cases treat only with the man at the top; it will save some trouble and a great deal of time.

TIME IS OF PRICELESS VALUE AT BEGINNING.

Time is of priceless value at the beginning. If it is a question of losing time or having misunderstandings with local authorities and railroads, act first and straighten things out afterwards; it is surprising how much you can do without any real authority if you insist on having your own way.

A competent steward should be in charge of the central office, and, if the territory is a large one, a stenographer and typewriter.

DIVISION CHIEFS.

The officer in charge should be free to go and come unfettered by office work, vouchers, and correspondence.

The chief in each district should have charge of all matters in that territory; receive the reports of inspectors, run over the lines himself pretty frequently, and at the same time cooperate, under the direction of his chief, with those in charge of the other districts. He should report direct to the man in charge of all the work, and take orders from him as far as concerns his immediate sphere of action.

OFFICER IN GENERAL CHARGE.

The officer in general charge should outline the work for each district chief, leaving the details very largely to them, but holding them to a strict accountability. He should visit all parts of his territory from time to time, investigate all rumors of the presence of disease, and transmit frequent reports of the work to the Surgeon-General, provided he can find the time. He should keep in close and cordial touch with the local health authorities everywhere, and with the heads of the transportation companies. The former are often a trifle suspicious at first, but tact and judgment usually overcome this very readily. It is often best to request as a favor what one could demand as a right. The people in the smaller Southern towns can usually be reasoned with—they are rather hard to force. The railroad people are generally eager to give every assistance, and their earnest cooperation is most essential. The discipline of a good road is of the greatest help when enlisted on our side. Generally speaking, the larger the corporation and the higher the rank of the official approached the more intelligent will be the assistance secured.

CHIEF OFFICER SHOULD KEEP INFORMED OF ALL WORK.

While the details of the work in each district may be left to the man in charge there, the chief should keep himself intimately informed of everything concerning the work in hand. In this work success depends on the execution of details; attention to details is really of rather more importance than excellence of general plan.

TRAIN INSPECTORS AND WHAT THEY SHOULD BE.

The inspectors should always be physicians. They should be furnished with plainly written instructions as to their duties, with formal credentials and badges, and if possible should be sworn in as deputy United States marshals.

MUCH AUTHORITY NEEDED BY INSPECTORS.

It will greatly facilitate the control of the train crews if each inspector is furnished with a letter from the general superintendent of the road, addressed to all employees of the road, and stating that the inspector is in absolute control of the train. A similar letter from the Pullman authorities should be furnished them, and they should have

keys to all cars. They must be instructed that in case they find a case of suspicious illness on their train they will be expected to stay by it and to accompany it to one of the observation camps, mentioned in Section V, Chapter II.

CAMPS OF OBSERVATION.

These camps should be small, consisting of a couple of tents properly equipped with cots, etc., and in charge of two reliable men, and established at several points, the location of which can only be determined on the ground. These camps are for the care of cases of suspicious sickness that may be found on the trains.

IMMUNITY DESIRABLE IN INSPECTORS.

The first tier of inspectors—those under the jurisdiction of the officer inside the infected place—should be immunes. Immunity is desirable but not essential in the others.

SCHEDULES OF INSPECTOR'S DUTIES.

A schedule must be prepared showing what each man's duties are, what train he takes, where he transfers, etc. At the central office it should be possible, by consulting this table, to tell just where each man is at a given time, as the train dispatcher locates his trains from his "train sheet."

Such a schedule may prove a more difficult job than it looks, for suitable inspectors can not always be found in sufficient numbers, and those found must sometimes sleep and eat; and, moreover, stations, sidings, State lines, etc., can not be moved at pleasure, so it may be rather a puzzle to fit the men to the runs.

As an illustration of such difficulties and how they are to be met, I give the schedule on the Nashville, Chattanooga and St. Louis Railroad last fall.

The trains were worked out of Nashville into the quarantined territory west of the Tennessee River. Some trains ran all the way into Memphis, some part of the way, and some, after entering the quarantined territory, merged their identity in trains on other roads that entered that territory from other points.

On some of the return runs the men could sleep in the Pullmans; on others they had to work both ways.

Schedule for Nashville, Chattanooga and St. Louis Railroad between Nashville, Memphis, and McKenzie.

Train number.	Departures.	Time.	Arrivals.	Time.	Runs and location of inspectors.													
					Date.													
					1st.	2d.	3d.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.
4.....	Nashville.....	7.00 a.m.	McKenzie.....	11.25 a.m.	1	8	7	6	5	4	3	2	1	8	7	6	5	4
61.....	McKenzie.....	2.05 p.m.	Nashville.....	6.20 p.m.														
60.....	Nashville.....	9.40 a.m.	McKenzie.....	2.31 p.m.	2	1	8	7	6	5	4	3	2	1	8	7	6	5
3.....	McKenzie.....	3.40 p.m.	Nashville.....	7.55 p.m.														
60-28.....	Nashville.....	9.40 a.m.	Memphis.....	7.00 p.m.	3	2	1	8	7	6	5	4	3	2	1	8	7	6
101.....	Memphis.....	9.30 p.m.	Nashville.....	8.00 a.m.														
62.....	Nashville.....	4.00 p.m.	McKenzie.....	8.41 p.m.	4	3	2	1	8	7	6	5	4	3	2	1	8	7
1-18.....	McKenzie.....	2.35 a.m.	Nashville.....	8.00 a.m.														
2-18.....	Nashville.....	8.45 p.m.	McKenzie.....	1.20 a.m.	5	4	3	2	1	8	7	6	5	4	3	2	1	8
1-24.....	McKenzie.....	2.35 a.m.	Nashville.....	8.00 a.m.														
2-24.....	Nashville.....	9.00 p.m.	Memphis.....	7.00 a.m.	6,7	5,6	4,5	3,4	2,3	1,2	8,1	7,8	6,7	5,6	4,5	3,4	2,3	1,2
53.....	Memphis.....	2.15 p.m.	Nashville.....	11.25 p.m.														

Each inspector to receive a number from 1 to 8 and take his run in accordance with the positions of said number on this sheet.
 1s means first section; 2s means second section.

DUTIES OF INSPECTORS.

At the beginning it must be explained that the special details of inspection duty will vary very widely on different roads and under different circumstances. In the first place the regulations of the State and local boards will greatly modify the action we must take, and, as a rule, greatly limit our usefulness. I am assuming now that the law under which the work will be done will be as at present.

TO KEEP INFORMED OF LOCAL REGULATIONS.

The inspectors must keep track of all the changes in the local regulations, or at least the officer in charge must; he must also keep track of the way the local authorities construe the State regulations, and if they propose to be bound by them. Very often they do not.

TO LEARN STATE LINES AND LOCAL GEOGRAPHY.

If the line on which the inspector works runs through more than one State, the inspector must lose no time in learning the location of State lines, otherwise he will have to consult a map or the brakeman before he can answer a passenger's inquiry as to his status, which rather impairs his prestige.

THESE RULES ARE ON BASIS OF NATIONAL QUARANTINE REGULATIONS.

It being understood then that no hard and fast rule can be laid down as to the action under State rules, I will outline how the inspector should work in order to simply carry out the national regulations, and will begin with the case in which the infected territory surrounds the road's terminus, or at least the place where the trains are made up.

INSPECTORS TO BE ON HAND AT DEPARTURE OF EACH TRAIN.

An immune inspector, acting under the orders of the officer in local command, will be on hand before the departure of the train to see that all regulations as to the character of coaches, etc., have been complied with. On boarding the train he will carefully inspect everyone, from the engineer down, for even if all hands are relayed at the end of a few miles it is most important that none of the crew be allowed to sicken, lest they infect the transfer station. The sanitary condition of the cars must be looked into, and if the cars on that run are being disinfected or placarded he must see that the disinfection has been properly certified to and that the placards are in place. Either the inspector himself or another man detailed for that duty must see that no undisinfected baggage or express matter for infectible territory is put on board. He will then proceed to make a careful examination of all the

passengers, ascertaining their recent whereabouts and their destinations. He will enter the names, etc., on the blank here given:

Report of United States sanitary inspector.

[Train No. — ; railroad, — — —.]

No.	Name.	Origin.	Destination.	Certificate issued at—	Date.	Remarks.

These forms should be furnished in book form and be used with carbon paper between the sheets, so as to preserve a record after the original has been torn out and given to the next inspector.

TRANSFER OF LISTS AT RELAY STATIONS.

On arrival at the relay station he will assist the inspector stationed there to supervise the exchange of crews. He will then examine the new crew and enter their names on his report.

If the train is a refugee train and runs straight through, his duties will be confined to seeing that no one either leaves or enters the train at the points where stops have to be made for orders or for water and coal. He will keep the doors locked, allow no passing to and fro between cars, and rigidly restrict the intercourse of the crew with the passengers. When the train stops in a town, or has to run very slowly, he will have all the windows kept closed, not to prevent the conveyance of infection, but to limit the chance of communication. Should a case of suspicious sickness occur, he must promptly isolate the patient, and his belongings and companions, and wire the facts to his own chief and to the chief of the inspectors into whose district he is running. The ultimate disposition of the patient depends upon the circumstances of the case. Generally speaking it is better to carry him on into non-infectible territory.

IN CASE OF REFUGEES IN SEPARATE COACHES.

If the run is one upon which the refugees are in separate coaches of a train, doing local work, the inspector must see that there is absolutely no intercourse between the different classes of passengers and that the reserved coaches are kept locked at all times and their windows closed while passing through or stopping at all stations. He will carefully examine all persons boarding the train and require them to present satisfactory evidence as to their recent whereabouts. If possible this should be done before the person is admitted to the train; indeed it ought to be

always done that way. Persons who can not give a satisfactory account of themselves should not be allowed to board unless holding tickets for points in noninfectible territory. Reaching the point where the in and out bound trains meet, the inspector will transfer to the inbound train, after delivering to the man who has come in on that train a copy of his passenger list, and given him all the necessary information about the train and the passengers. His list should include the crew and every person who has boarded the train up to that time. It will greatly facilitate the work if the agents are forbidden to sell tickets to those without papers.

"INSIDE" MEN AND "OUTSIDE" MEN.

The inspector who comes down on the inbound train, hereafter to be designated the "outside man," will transfer to the outbound train and proceed to check up the passengers with the list furnished him. On the way down he will have made a similar list of his passengers for delivery to the "inside man." He will also have carefully inquired into the recent whereabouts of all who are on board the train. Neither he nor the inside man should allow anyone to leave unless satisfied as to their antecedents. Of course it is not necessary for the doors and windows of the inbound train to be locked, but it is necessary that no one should enter or leave the train except by the permission of the inspector.

PURELY REFUGEE TRAINS WITHOUT LOCAL BUSINESS.

Of course in the case of a purely refugee train the outside man simply continues the supervision kept up by the inside man, and accompanies the train back to the starting point of his run.

TRANSFERS OF PASSENGERS TO OTHER LINES.

The outside man maintains the restrictions then until he reaches the starting point of his run, at which place the passengers are either allowed to proceed without further supervision or are turned over to the next inspector with the list received from the inside man, with the additions made since the transfer. This last list can usually be omitted as far as the purely local passengers are concerned. For instance, there is no use in making a list of the purely local people coming into Memphis over the Illinois Central. The inspector through whose hands the list passes should note on it the disposal of each passenger, whether he went on through, or transferred to another line, etc. All the way along, the inspectors should note on the report if passengers were received from branches or intersecting lines.

Where such transfers are made, a list of the names, etc., of those transferred should be furnished the inspector on lines to which they go.

ULTIMATE DISPOSITION OF PASSENGER LISTS.

At the conclusion of the run the report, bearing the checks and notes of the various men through whose hands it passes, is filed at the central office, and should be preserved there as a means of checking up the movements of individuals whose previous whereabouts may be called in question.

The receipt and filing of these reports should not be allowed to become a purely routine matter.

EVASION OF RESTRICTIONS BY DETOURS.

Of course it is impossible to prevent individual cases of evasion, but the people who take much trouble to evade the restrictions by making detours involving several days' travel are really not a source of much danger.

DUTIES OF INSPECTORS ON "SHUTTLE" TRAINS.

When a "shuttle train" is used between the infected place and the relay station, the man in charge of it does not have time to list the refugees; he merely has a general supervision of them, sees that none are actually sick, that all are delivered to the inspector who takes out the train from the relay station, and should also see that the coaches of the train are kept in good sanitary condition.

LINES RUNNING THROUGH INFECTION BUT CLEAN AT TERMINI.

In the case of lines running through an infected place, but with both their termini in clean territory, the control of the entire inspection system should be in the hands of one officer.

Here there are no relays to look after, but if the place is of any size there should be designated points on either side of the town at which trains should stop and be searched for tramps and stowaways.

The inspectors should, if possible, run from end to end. If the run is a long one they work one way and sleep on the way back. If this is impracticable they exchange at meeting points.

If the place is too small to warrant running a regular refugee train, or using refugee coaches attached to regular trains, a way of escape can be arranged by running a special on certain days.

In either method an inspector should be assigned to the duty of superintending the embarkation of refugees, giving to such as desire it a descriptive card with the date, to be used by the recipient as a means of identification, should he desire to enter infectible territory after serving out his period of detention elsewhere. In all these methods it is desirable that the refugees be handled on day trains only, for the greater facility in observation and control thus obtained.

The method of preparing lists of passengers, reporting, and making transfers being as already described.

THE CLASS OF ROADS THAT ARE ONLY COVERED ON ACCOUNT OF THE POSSIBLE LATERAL MOVEMENT OF PASSENGERS FROM OTHER LINES.

In some cases this may be very important, as in the work about Brunswick, Ga., where the Savannah, Florida and Western and the Florida Central and Peninsular, while they did not enter the city, were of quite as much importance as the roads that did.

Ordinarily, however, this is not the case, and it is not necessary for the inspectors to list their passengers. They should, however, carefully investigate the antecedents of all and allow no one to leave the train in infectible territory whose history is not clear.

At junction points, where passengers may be received from lines from infected territory, all passengers boarding the train must be required to present their papers.

If the connection is a close one the refugees are received direct from the inspector on the other train, otherwise they should have transfer cards as described below.

AS TO THE USE OF SEPARATE CARS.

As the number of such persons will usually be very small, often not over one or two, and as they are usually well when received, it will not be necessary to put them in separate cars.

Theoretically this is not sound, but practically it is. It must be remembered that much of the isolation to which we subject refugees is for the alleviating of the uneasiness of other passengers and for the restoration of public confidence in the more seriously threatened, and consequently panic-stricken, sections.

The inspectors will run straight through, or to meeting points, as is most convenient.

NO RESTRICTION TO TRAVEL FROM COLLATERAL POINTS IN CLEAN TERRITORY.

No restrictions need be put upon the movements of people boarding the train at points out of reach of the main lines from infected territory, but those received from such lines and those unable to give a satisfactory account of themselves must be prevented from leaving the train in infectible territory.

If the inspector only goes to the meeting point and has refugees on his train he delivers a list of them to the man he transfers them to.

MANAGEMENT OF JUNCTION POINTS.

The management of junction points is often very difficult. It is absolutely necessary for their control that we should reach an amicable arrangement with the local authorities, otherwise travel may be utterly

and needlessly blocked and great loss and hardship be imposed on innocent people.

In two conspicuous cases last fall business was paralyzed and the really necessary work of inspection severely hampered by the unnecessary obstinacy of the authorities at important junctions.

If the train connections are such that a lay over or transfer through town is necessary, these should be in charge of a man stationed permanently at the junction.

Transfers should be made under direction and the travelers be absolutely under control of the inspector.

The inspector on the train which brings the people should give to each a signed card bearing the date, name, place of origin, destination, and train desired to be taken. The card should state across the face that it is good only on day of issuance.

By means of these cards the inspector at the junction can rapidly decide what action is necessary, and when the traveler boards the train the card, previously initialed by the man at the junction, will serve as a guide to the inspector thereon.

If the junction is a close one the cards are also to be given as a guide to the new inspector.

This may seem impracticable, but it is not, and is a help to the inspectors.

If the local authorities are competent and willing they can be allowed to handle the transfers. They did so at Memphis in 1897. Such a reciprocity is in many ways most desirable, even at the loss of a certain amount of direct control.

A volume might be written on the subject of the possible action of local authorities—how they may aid or hinder the work, and how the conditions thus arising are to be met—but as neither the prophetic vision of Daniel nor the wisdom of Solomon could foretell the occurrence of or divine the reason for much that they will do, it is useless to discuss the matter here.

Through deserving the confidence of the people by conscientious attention to details all will be done that can be done.

This, assuming the law to be as at present or as it may be if amended. The wishes of the people will have to be deferred to as long as not inconsistent with safety.

OFFICER IN CHARGE SHOULD KNOW ALL LOCAL AUTHORITIES.

The officer in charge should visit as many places as possible along his roads and get in personal touch with the authorities, but should avoid "conferences" at any cost. He should see that all local rules not inconsistent with his orders and the regulations are enforced as if they were his own, and should promptly advise his inspectors of any changes in the State or local rules.

It may be observed that I have often spoken of "satisfactory evidence" as to recent whereabouts.

WHAT CONSTITUTES SATISFACTORY EVIDENCE OF HEALTH.

It is the custom to speak of "health certificates" in this connection. I have purposely refrained from doing so.

The ordinary "health certificate" certifies to nothing at all. The city of New Orleans issued health certificates when the town was full of fever. At Memphis the certificate was merely a statement by the health board that A. B. had appeared and made certain statements which they had not verified. Atlanta had the best form of certificate, but none of them were good for much. The only certificate that is worth much is one in which the physician or other responsible party makes oath before an officer possessing a seal that the facts are so and so, or in which such an officer verifies the signature of the party issuing it. This is a hardship on the ignorant and an expense to the needy, and by no means to be always exacted. An intelligent inspector can soon learn to divide the sheep from the goats. The sales books of drummers, telegrams, the postmarks of letters, the dating stamps of the railroad agents at the various places at which the man has been, and many forms of evidence are all worth more than the ordinary certificate. The trafficking in "health certificates" was quite an industry last fall, and the issuing of them at 50 cents or \$1 apiece proved better to some people than private practice.

Of course immunes and those who hold discharges from service camps may be allowed to go freely to their destinations. For most of the others the sworn health certificates or similar evidence must be required; for wayside stations the identification of the station agent suffices.

Probably no one will again be called upon to handle such thousands of people as the Nashville Exposition put in motion throughout the South, so I have said nothing of the special organization in such cases.

At best the scope of this article does not admit of much discussion of details. They must be left for their management to individual judgment.

WHAT IS TO BE DONE WITH PERSONS WHOSE HISTORY IS IN DOUBT.

One part is of interest, however. What is to be done with persons without satisfactory evidence as to their antecedents who are found upon trains bound for infectible territory? We can't land them. What, then, can we do with them? We can compel the roads to return them to the points whence they took them, but if they have not the wherewithal to feed themselves en route, and if they come to the line on which we find them from some other line, their condition may be most distressing.

I am of the opinion that, if such people are manifestly innocent of intent to evade the inspectors, we should feed them en route, if necessary, and use our utmost endeavors to have them returned to their homes.

For the far larger class of unfortunates, who, while of perfectly acceptable status as far as the national inspector is concerned, are rejected by local authorities, there is very little to be done.

They are in the position of an old man on the Illinois Central, whom the road, in trying to deliver at a point in southern Mississippi, had three times in succession transported from Chicago to the South and back. As he began his fourth return trip he lifted up his voice and wept, "The good Lord only knows what will become of me."

FREIGHT TRAFFIC.

The handling of freight trains presents special difficulties. I am of the opinion that freight trains are a greater menace than passenger trains. They are more numerous, they run at irregular hours, they make longer and more frequent stops, and they are made up of cars from all sorts of localities. So much for the trains themselves.

PERSONNEL OF FREIGHT TRAINS PARTICULARLY DANGEROUS.

As to their personnel, the crews are less subject to control than passenger crews; they are changed more frequently, and the handling of the train at the stops involves more opportunities for contact with the people at those places; then we have to remember that the freight train is the "route of election" chosen by tramps proper and other irregular travelers; of these latter the most dangerous class are the railroad men out of a job, who are smuggled along by their mates in cabooses or box cars, as the discipline maintained on the road may determine.

TRAMPS AND RAILROADERS SEEKING WORK.

They come from infected places perhaps because work is slack and they go anywhere they choose, inspection or no inspection. The crew will usually promptly eject the tramp, but will harbor the "railroader."

All freight crews must be changed at relay stations, as the passenger crews are, and when there is much business out of a large and thoroughly infected place there should be inspectors at the next division points to inspect the crews arriving at the relay stations and to look out for irregulars.

WHAT TO DO WITH IRREGULAR TRAVELERS.

This brings up the question of what shall we do with the tramps and irregulars found on either freight or passenger trains. Usually the crew promptly ejects them—almost invariably in the case of passenger crews—without the slightest care as to where they come from or how dangerous they may be to the community where "fired."

OBSERVATION CAMPS.

To meet this difficulty Acting Assistant Surgeon Frick has suggested that at certain designated points there should be small camps of observation, and that the train crews should have positive orders *not* to eject persons found stealing rides, but to deliver them at said points to the care of an inspector. They can then either be forwarded in batches to noninfectible territory or made to serve out their period of detention.

Even where there is a regular detention camp within a few hours' run, it would be much better to deliver the tramps at the certain points as suggested by Dr. Frick, and then transfer them under guard to the regular camps.

This duty could be assigned to the men on duty at the freight division termini.

The scope of this article does not admit of treating these questions in fuller detail. It is a knotty problem, and will tax the ingenuity of anyone who has to handle it.

UNIFORMITY OF METHOD ESSENTIAL.

In conclusion, too much stress can not be laid upon the necessity of securing uniformity of method by putting as much territory as possible under one officer and of supplying as many regular officers as possible as assistants.

Under existing laws we can not do so very much toward suppressing the disease when it occurs, but we can do something toward limiting its spread.

SYNOPSIS OF THE INTERSTATE QUARANTINE REGULATIONS OF THE TREASURY DEPARTMENT.*

By P. A. Surg. J. H. WHITE.

In undertaking to prepare a précis of the Interstate Quarantine Regulations, it is apparent at once that such précis will be only a synopsis of the articles preceding this; i. e., Sections D, E, and F.

NOTIFICATION.

It is imperatively necessary that early notification should be given to the Surgeon-General of the United States Marine-Hospital Service of the existence of the first case of yellow fever in any community if good results are to be attained. It does not follow that this information becomes public property. What is easy if promptly handled becomes a herculean task if allowed to go unheeded for several weeks. Local physicians should notify their local or State health officers and the latter should in turn notify the Surgeon-General of the Marine-Hospital Service, either directly or through the nearest Marine Hospital officer. Telegrams conveying said information can be sent collect.

RELATION OF MUNICIPAL TO INTERSTATE EPIDEMIC WORK.

It should be borne in mind that the best possible means for prevention of interstate spread of any disease is the suppression of the initial case *at once*. The fundamental principle of sanitary work is, *End the disease with the first case*. It may be stated as a fact that the risk of spread and the work of suppression increase in geometric progression as the number of infections increase.

ISOLATION OF SICK.

Upon the discovery of a case of yellow fever, the patient should be promptly isolated and care taken to disinfect all textiles, etc., which may have been infected by the sick. Careful examination should be made of each and every inmate and all healthy persons placed in another house, there to undergo eight days' observation at the hands of a competent physician, and if no case occurs among them they should be released.

Before isolation, however, their clothing should be disinfected. The infected house should be rigorously quarantined and no one allowed

*The interstate quarantine regulations promulgated by the Secretary of the Treasury are published in full and issued in pamphlet form by the Marine-Hospital Bureau.

entry or exit except the physician, who should isolate himself, unless immune, and adopt all proper precautions, arrangements being made for the provisioning of the nurses and the patients in such manner as to avoid any spread of infection.

All this is fully stated by Surgeon H. R. Carter in Chapter I, Section D, including the disinfection.

DEPOPULATION.

Two distinct means offer themselves in the handling of the first cases:

I. Removal of the sick and those exposed with them to isolated and separate, and as nearly as may be noninfectible quarters.

II. Depopulation of the immediate vicinity within a radius of about 200 yards, and then treating the patient where he sickened, with a subsequent disinfection of not only his own but other nearby residences, and especially those to leeward of the sick.

A little thought will show that the first is by far the best method of dealing with original cases, as it necessitates less disinfection and tends to remove public disquietude, which in itself is a factor not to be despised.

When it is found that we have several cases in a town and the source is not definitely known, it is, I believe, advisable to quarantine with an impassable cordon the whole town, but only until inspection, house to house, shows exactly what section of the town is infected; then release the remainder and cordon that section until it can be depopulated into a camp; treat the sick until well, and disinfect all houses where sickness has existed. I am of the opinion this is possible if the presence of yellow fever is discovered before there are more than twenty cases existent; and while it would be difficult of execution, yet it promises such results as to justify the effort; and if successful, it means the extirpation of an epidemic more promptly than would be otherwise possible.

Success in this way was attained at Franklin, La., Nittayuma and Cayuga, Miss., and other points. (See Section D, Chapter I, by Surg. H. R. Carter.)

HOUSE-TO-HOUSE AND NEIGHBORING VILLAGE INSPECTIONS.

Immediately on the discovery of yellow fever inquiry should be made as to the whereabouts of persons who have been exposed. These should be traced to neighboring or even to distant villages or places and kept under observation. In the meantime a careful house-to-house inspection should be made in the infected locality.

PASSENGERS LEAVING INFECTED PLACES.

Exit should be permitted to all persons from infected towns who desire to go to places beyond the limit of possible epidemic, i. e., such as from New Orleans to Chicago, and in such cases disinfection of effects, while of course salutary, so far as persons themselves are concerned, is not necessary if they remain North.

All parties, save immunes, going to places inside such lines, i. e., into infectible territory, should go into the detention camps mentioned in this writing.

PROVED IMMUNES GOING THROUGH AFTER BAGGAGE DISINFECTION.

All persons, wherever going, should be under the eye of train inspectors, and this should particularly include railroad employees and officials, as by constantly entering the infected locality they are peculiarly liable to be carriers of infection.

All trainmen should be relayed at some convenient point near the infected city, so that no single one of them shall go beyond that relay point, either of the crew belonging at the infected or that belonging at the noninfected end of the line.

Coaches should be disinfected at their point of destination (in clean territory), and, in so far as convenient, upholstered coaches should not be used (this simply to minimize the work of cleansing).

Train inspectors should also be relayed and an inspector accompany each train until it reaches noninfectible territory. They should also keep watch on return trip against the doubling back of people recently out of infected zone and seeking entry to clean but infectible territory.

Exit should be encouraged early in the outbreak, because at that time the amount of possible risk is less than it will be when the town is largely infected.

GUARDS, ATTENDANTS, ETC.

It is of prime importance that all persons exposed to the sick man or his belongings, in the endeavor to suppress infection, should be immune to yellow fever, and wherever possible all should be so. In the case of the death of a patient the body shall be disposed of under such sanitary precautions as will prevent the conveyance of infection.

WHEN NECESSARY TO PUT ON ABSOLUTE QUARANTINE.

When the number of cases becomes so great that it is not possible to exactly trace the origin of each, and it becomes evident that cases are being concealed, a complete quarantine of the whole community becomes necessary.

I shall not enter fully into this subject, as it is entirely covered in Section D by several writers, and notably by Dr. Carter.

If I have succeeded in impressing upon the reader the imperative necessity of detection and isolation, and proper handling of first cases, I am more than satisfied. This is the very keystone of interstate quarantine measures.

We must treat first cases with such tender consideration—provide such nursing and medical attendance, and at little or no cost to the patient's family—that isolation shall become even attractive, if that be possible, for be it well remembered that concealed cases will spoil the best arrangements.

A PRÉCIS OF THE UNITED STATES QUARANTINE REGULATIONS FOR DOMESTIC PORTS WITH REFERENCE TO PREVENTING THE INTRODUCTION OF YELLOW FEVER INTO THE UNITED STATES.

By Surg. PRESTON H. BAILHACHE.

As yellow fever is not an endemic disease of this country, regulations for the prevention of its introduction from abroad have been prepared by the Surgeon-General of the Marine-Hospital Service, under the direction of the Secretary of the Treasury, and promulgated by the Department under date of April 26, 1894.

PRIMARY MEASURES.

The primary measure to be adopted to prevent the introduction of this disease into the United States is the establishment at the principal ports of the country of completely equipped quarantine stations for the inspection and treatment of vessels, their passengers, crews, and cargoes. At smaller stations, where it is impracticable to fully equip and maintain a complete establishment, provision should be made for the inspection of such vessels, and these inspections should be maintained at every port throughout the year.

PERSONNEL SHOULD BE IMMUNE.

The personnel of Southern quarantine stations should be immune to yellow fever, and all articles liable to convey infection should be handled only by the employees of said station, if practicable.

INSPECTION.

Vessels arriving at ports of the United States under the following conditions shall be inspected by a quarantine officer prior to entry:

- A. Any vessel with sickness on board.
- B. All vessels from foreign ports.
- C. Vessels from domestic ports where yellow fever prevails.
- D. Vessels from foreign ports carrying passengers having entered a port of the United States without complete discharge of passengers and cargo. Such vessels shall be subject to a second inspection before

entering any other port. Vessels from ports suspected of infection with yellow fever, having entered a port north of the southern boundary of Maryland without disinfection, shall be subjected to a second inspection before entering any port south of said latitude during the quarantine season of such port.

The inspections of vessels shall be made by daylight, except in case of vessels in distress.

In making the inspection of a vessel, the bill of health and clinical record of all cases treated during the voyage, crew and passengers' lists and manifests, and, when necessary, the ship's log shall be examined. The crew and passengers shall be mustered and examined and compared with the lists and manifests and any discrepancies investigated.

No person except the quarantine officer, his employees, United States customs officers, or agents of the vessel, shall be permitted to board any vessel subject to quarantine inspection, until after the vessel has been inspected by the quarantine officer and given its discharge.

VESSELS SUBJECT TO QUARANTINE MEASURES.

A. Vessels arriving with yellow fever on board.

B. Having had such on board during the voyage or within thirty days next preceding arrival, or, if arriving in the quarantine season, having had yellow fever on board after March 1 of the current year, unless satisfactorily disinfected thereafter.

C. Vessels from noninfected ports, but bringing persons or cargo from places infected with yellow fever.

D. From ports where yellow fever prevails, unless disinfected in accordance with these regulations, and not less than five days have elapsed since such disinfection.

Exceptions to C and D.—Vessels arriving during certain seasons of the year, to wit, from November 1 to April 1, may be admitted to entry.

Vessels bound for ports in the United States *north of the southern boundary of Maryland*, with good sanitary condition and history, having had no sickness on board at ports of departure, en route, or on arrival, provided they have been five days from last infected or suspected port, may be allowed entry at port of destination. But if said vessels carry passengers destined for places south of this latitude the baggage of said passengers shall be disinfected.

In making an inspection of a vessel, if from a port where yellow fever prevails, and between April 1 and November 1 of any year, the inspector shall ascertain the destination of each passenger thereon, and if bound for places south of the southern boundary of Maryland, the baggage of such passenger shall be disinfected according to the rules for such articles infected with yellow fever. Such baggage shall be labeled.

Vessels engaged in the fruit trade from ports declared safe for this purpose by the Supervising Surgeon-General Marine-Hospital Service, may be admitted to entry without detention, provided that they carry no passengers and have carried no passengers from one port to another, and have no household effects or personal baggage in cargo, and have complied with the special rules and regulations made by the Secretary of the Treasury with regard to vessels engaged in said trade.

PASSENGER TRAFFIC.

Passenger traffic may be allowed during the quarantine season from any port infected with yellow fever to any port of the United States south of the southern boundary of Maryland under the following conditions:

- (a) Vessels to be of iron, and clean immediately prior to taking on passengers.
- (b) The vessel must lie at moorings in the open harbor and not approach the wharves, nor must the crew be allowed ashore at the port of departure.
- (c) All passengers and crew must be immune to yellow fever, and so certified by the United States medical officer.*
- (d) All baggage which has not been disinfected at the port of departure by the United States medical officer, or which is not in bond for points north of the southern boundary of Maryland, shall be disinfected at the quarantine at the port of arrival; no bedding or household effects to be allowed to enter.

GENERAL REQUIREMENTS AT QUARANTINES.

Pilots bringing infected vessels will be detained in quarantine a sufficient time to cover the period of incubation of the disease for which the vessel is quarantined if, in the opinion of the quarantine officer, such pilots have been exposed to infection. The dunnage of pilots shall be disinfected when necessary.

No direct communication shall be allowed between quarantine, or any vessel in quarantine, with any person or place outside, and no indirect communication except under the supervision of the quarantine officer.

No ballast shall be allowed to leave the quarantine station unless disinfected.

Where it is impossible to disinfect cargo in situ, it shall be removed and disinfected in the manner provided for articles of their class in these regulations; such articles to be unpacked and so arranged as to allow the disinfectant used to reach every part of all surfaces of said articles.

Vessels arriving at any port of the United States, having yellow fever aboard during the quarantine season, shall be remanded to an anchorage set apart for infected vessels, and there to remain until after the discharge of the passengers and purification of the vessel.

All passenger baggage disinfected under the requirements of these regulations shall be labeled.

Vessels detained at any national quarantine will be subject to such additional rules and regulations as may be promulgated from time to time by the Supervising Surgeon-General.

The following is the form of certificate which shall be issued to the vessel by the health officer when she is released from quarantine:

_____, _____, 189—.

I certify that _____, of _____, from _____, has in all respects complied with the quarantine regulations prescribed by the Secretary of the Treasury, and that in my

* The evidence of immunity which may be accepted by the sanitary inspector is:
First. Proof of continued residence in an endemic focus of yellow fever for ten years.

Second. Proof of previous attack of yellow fever.

opinion she will not convey quarantinable disease. Said vessel is this day granted free pratique.

_____,
Health (Quarantine) Officer,
Port of _____.

SPECIAL REGULATIONS RELATING TO NAVAL VESSELS.

1. At domestic ports such communication may be allowed with vessels of the United States Navy as the certificate of the medical officer of said vessel shows will not be liable to convey infection.

2. The certificates of the medical officers of the United States Navy that the United States quarantine regulations have been complied with may be accepted for naval vessels.

3. Vessels of the United States Navy, having entered the harbors of ports infected with yellow fever, and having held no communication which is liable to convey infection to the vessel or her crew, may be exempted from the quarantine restrictions imposed on merchant vessels from such ports.

TREATMENT OF VESSELS INFECTED OR SUSPECTED OF BEING INFECTED WITH YELLOW FEVER.

Where practicable, at once remove the sick to hospital; remove and isolate all persons not required for the care of the vessel.

If the hold is deemed infected, there shall be a preliminary disinfection as hereinafter provided.

The bilge should be cleansed with sea water, if possible, before disinfection, and the hold rendered mechanically clean.

All ballast except close grained hard rock must be discharged. This may be retained aboard if disinfected by immersion in an acid solution of bichloride of mercury, 1 to 800.

After discharge or disinfection of ballast the vessel should be disinfected.

If it is so stowed as to admit of disinfection, the cargo and the hold may be disinfected without breaking bulk, except to such a degree as to render disinfection practicable.

The personnel of the vessel shall be detained five days from completion of the disinfection, or three days if all baggage, etc., is handled exclusively by quarantine employees.

If the vessel has been disinfected under the supervision of an accredited medical officer of the United States at the port of departure, the period of quarantine may date from completion of such disinfection, and shall not be less than five days.

The following regulations are provided for the disinfection of a vessel infected or suspected of being infected with yellow fever :

DISINFECTION BY SULPHUR DIOXIDE.

Holds to be treated with sulphur dioxide, 10 per cent strength per volume, forty-eight hours' exposure for iron vessels, and seventy-two hours' for wooden vessels.

Empty holds to be disinfected as follows :

(a) If of iron, by sulphur dioxide gas, 10 per cent strength per volume, for twelve hours' exposure, followed by washing with an acid solution of bichloride of mercury, 1 to 800, applied under pressure to all surfaces by means of a hose.

(b) If of wood, by the same methods as the preceding, save that the exposure to sulphur dioxide gas shall be for forty-eight hours; air streaks to be open.

Cabin, forecastle, etc., after mechanical cleaning, to be first treated with sulphur dioxide, not less than 6 per cent strength per volume, twenty-four hours' exposure. Then, after cleansing with water if desired, wash all exposed surfaces with a solution of bichlorid of mercury, 1 to 800, or pure carbolic acid, 3 per cent.

DISINFECTION BY STEAM.

Clothing, bedding, and all fabrics which can be removed, not injured by steam, shall be disinfected:

(a) By exposure to steam at a temperature of 100° to 102° C. for thirty minutes after such temperature has been reached.

(b) By boiling for fifteen minutes; all articles to be submerged.

(c) By a thorough saturation in a solution of bichlorid of mercury, 1 to 1,000, and allowed to dry before washing.

Articles injured by steam (rubber, leather, etc.), and containers, to the disinfection of which steam is inapplicable, shall be disinfected by (a) thoroughly wetting all surfaces with a solution of bichlorid of mercury, 1 to 800, or a 5 per cent solution of pure carbolic acid, and allowed to dry in open air; or (b) by exposure to the sulphur fumigation in cabin, forecastle, or hold.

DISINFECTION BY FORMALDEHYD GAS.

Since the introduction of formaldehyd gas as a disinfectant, additional regulations were promulgated August 5, 1897, as follows:

DISINFECTION OF STEERAGE, FORECASTLE, AND CABIN OF VESSELS.

After the removal of the bedding, carpets, and furnishings, all apertures being tightly closed, the steerage, forecastle, and cabin of a vessel may be disinfected by formaldehyd gas in a percentage of not less than 2 per cent per volume strength, the time of exposure to be not less

than twelve hours. The gas may be generated by one of the following methods:

(a) From methyl (wood) alcohol by means of special lamps, using not less than 600 grams (750 cubic centimeters = $1\frac{4}{5}$ pints) of methyl alcohol for each 25.5 cubic meters (1,000 cubic feet) of space, the time of exposure to be not less than twelve hours.

Lamps used for generating formaldehyd gas from methyl alcohol should change not less than 1 liter (1.01 quarts) of the alcohol within an hour.

(b) From an aqueous solution, containing 40 per cent of the gas, known under the names of formalin, formol, or formalose. The gas is best evolved from these solutions by the addition of from 10 to 30 per cent of a neutral salt, preferably calcium chloride or sodium nitrate, and heating the mixture in a special boiler. One liter of a 40 per cent solution of formaldehyd gas will evolve [about 1,425 liters (50.1 cubic feet) of the gas at 20° C. (68° F.), and will be sufficient for 71 cubic meters (2,505.5 cubic feet) of space.

(c) From the substance known as trioxymethylene, by means of a special lamp, not less than 2 grams (30 grains) to be used for each cubic meter (35.29 cubic feet) of space.

After the disinfection of apartments (steerage, cabin, and forecastle) by formaldehyd gas, the latter should be neutralized by ammonia gas evolved from water of ammonia by heat or by evaporation from water of ammonia sprinkled upon the floor.

NOTE.—The quantity of water of ammonia required for neutralization after each of the above-named methods is as follows: After method (a), 1 liter (1.01 quarts) of water of ammonia for each 1,000 cubic centimeters (1.01 quarts) of wood alcohol used; after method (b), $1\frac{1}{4}$ liters (1.26 quarts) of water of ammonia for each liter (1.01 quarts) of formalin; after method (c), 1 liter of water of ammonia for each 150 grams (5 ounces) of trioxymethylene.

DISINFECTION OF CLOTHING, BEDDING, UPHOLSTERED FURNITURE, ARTICLES OF LEATHER, ETC.

These may be disinfected by formaldehyd gas in the ordinary steam disinfecting chamber, the latter to be provided with a vacuum apparatus and special apparatus for generating and applying the gas. The gas should be applied in a dry state in not less than 20 per cent per volume strength, the time of exposure to be not less than one hour. Clothing bedding, etc., thus disinfected should be exposed in situ to an equal amount of ammonia gas generated by the special apparatus attached to the chamber, using 1 liter of water of ammonia to each liter of formalin; or compressed ammonia gas may be used.

NOTE.—The special apparatus must consist of a generator, constructed of copper, for evolving formaldehyd gas from its solutions, and a similar one of iron for evolving ammonia gas for neutralization. The principle upon which this apparatus is constructed is described and illustrated in Public Health Reports, Marine-Hospital Service, January 29, 1897, Vol. XII, No. 5.

A CONCISE EXPLANATION OF THE MARITIME QUARANTINE REGULATIONS OF THE TREASURY DEPARTMENT RELATING TO YELLOW FEVER.

By P. A. Surg. J. H. WHITE.

INTRODUCTORY.

It is the purpose of this article to convey to masters of vessels and other interested parties a clear idea of the demands put upon them by the United States Quarantine Regulations.

REQUIREMENTS AT FOREIGN PORTS INFECTED OR SUSPECTED OF BEING INFECTED WITH YELLOW FEVER.

VESSELS AND CARGO.

All vessels intending to enter ports of the United States south of Chesapeake entrance should, while lying in yellow-fever ports or ports under suspicion of yellow fever, avoid the wharves and lie at anchor in the open stream or harbor. They should take on board from said ports only such stuff as may be absolutely essential, and all that is taken aboard should be disinfected. *This is especially true of clothing.* Household goods should be debarred.

DISINFECTION.

If it be necessary to receive clothing (as of troops returning from war, etc.), and no other means is at hand, a compartment of the ship may be set aside temporarily for the purpose and the clothing disinfected therein by hanging on cords so as to freely expose all surfaces, and then exposing to sulphur dioxid for twenty-four hours, burning 5 pounds of sulphur to each 1,000 cubic feet of space so devoted. The vessel's own steam may be utilized for disinfection in any tight compartment above water line. This will ordinarily accomplish the result desired, or will at least minimize the danger of an outbreak among the crew and passengers.

It is safest to disinfect *all clothing*, though as a matter of fact there is little danger in that actually worn, unless the wearer has been for a long period in direct touch with yellow fever, as in case of doctors and nurses.

PERSONS TAKEN SICK ABOARD SHIP EN ROUTE TO THE UNITED STATES.

Any person taken sick aboard ship bound for the United States from yellow-fever countries should be promptly isolated.

A room, well aft in a steamship or forward in a sailing vessel (in order to be to leeward of all healthy persons), should be set apart and kept constantly ready for yellow-fever suspects.

The patient and his exposed clothing and bedding should be at once taken to this room.

In this connection I would refer to the articles on Diagnosis of Yellow Fever, by Drs. Murray and Guiteras, and to Section D, Chapter I, by Dr. Carter, on measures to prevent the spread of fever.

These articles distinctly show the possibility of early diagnosis in the first place and of perfect isolation and noninfection of surroundings in the next.

LIMITATION OF INFECTION ON SHIPBOARD.

The latter point, i. e., not to allow infection of the hospital room itself, is of manifest importance, and if careful disinfection of all clothing and bedding is done as fast as disused, and if these articles are changed every twenty-four to forty-eight hours and rubber sheet used over mattress, the end is likely to be attained. This protection of the ship, and confinement of infection to one narrowly limited portion thereof, has been done. I have seen it, and I think Surg. H. R. Carter reports having seen this limitation successfully carried out by ship captains.

With a skillful surgeon on board it should be possible to stamp out an infection.

TREATMENT UPON ARRIVAL AT PORTS OF THE UNITED STATES.

Pilots.—Vessels from ports suspected of or infected with yellow fever should not be boarded by pilots when bound to ports south of Chesapeake entrance, but should be “conned in” by the pilot to the nearest inspection station.

WHEN A VESSEL IS SUBJECT TO QUARANTINE.

All such vessels are subject to disinfection and detention between April 1 and November 1 of each year, unless they be vessels of the United States Navy, provided with medical officers of said service, and said medical officers can certify that there has been no communication with the shore at infected points, or only such carefully guarded communication as is free from danger. (See previous chapter, Special Regulations for Naval Vessels.)

TREATMENT OF INFECTED OR SUSPECTED VESSELS.

Bear in mind that a suspected vessel is to all intents an infected vessel in so far as treatment is concerned and differs therefrom only in that it probably has no sickness aboard.

The treatment for such vessels is laid down in full in the précis, Section H, Chapter I, by Surg. P. H. Bailhache, and I will here only state that subsequent to the completion of the necessary disinfection, a detention of from three to five full days of twenty-four hours each is necessary to the end that we may be reasonably sure that no accidental exposure during the process of disinfection results in an outbreak of yellow fever after discharge of the vessel. Five days' detention is required unless disinfection of all baggage, dunnage, etc., has been performed exclusively by quarantine employes.

The details of disinfection are so fully elaborated in Dr. Bailhache's article as to render repetition unnecessary.

Should any person aboard be attacked by yellow fever while the vessel is under observation subsequent to her disinfection, it becomes necessary to at once remove the sick person and subject his vacated premises to a rigorous redisinfection; but, unless there has obviously been a fault somewhere in the previous work, it is not necessary to redisinfect the whole ship nor to detain her another full five days. This is generally done, but it is really more a measure to satisfy public anxiety than a precaution dictated by true hygienic principles. The fact being well established that *a yellow-fever patient does not infect his surroundings under forty-eight hours at least, or, in better language, that infection resulting from a patient does not become active under forty-eight hours*, we should take advantage of this to avoid a spread of the disease and full infection of the ship, and it is plain that removal of patient and disinfection of his quarters does this effectually. Here let me say, however, that it is well to have grave suspicion that the primary disinfection was not thorough if a case develops after six days have passed subsequent to it, and such late development should justify a full secondary disinfection of the whole ship.

QUARANTINE DETENTION AT NORTHERN AND SOUTHERN PORTS.

The different rules adopted for Northern and Southern ports, with regard to vessels and persons from yellow-fever infected ports are concisely set forth in the following extract from a letter addressed by the Surgeon-General of the Marine-Hospital Service to a quarantine officer in the South:

Your third inquiry is as follows: "Whether the rule requiring the detention of vessels three days after being disinfected is a general law, or only applying to southern ports?" In reply to this inquiry I have only to suggest a careful examination of the United States Quarantine Regulations, from which it will be seen that at all ports south of the southern boundary of Maryland, which is an arbitrary line, vessels coming from an infected port, whether the vessel itself gives evidence of yellow fever or not, are subject to disinfection and detention of their personnel. At ports north of the southern boundary of Maryland this regulation does not apply. If the vessel carries no known infection at a northern port it may be admitted without detention, even though it comes from a port which is ordinarily infected with yellow fever, but the passengers on such a vessel must be detained a sufficient length of time to make five days from the infected port. This is done at New York

and at our national quarantine stations on the Delaware Bay and River. The Attorney-General has rendered a decision declaring that this regulation is legal.

In regard to the change of crew at the quarantine station, you will observe that the quarantine regulations say that the personnel of the vessel shall be detained for three days after disinfection—not the vessel itself. So that if the vessel's crew is taken off immediately on entering quarantine, if the vessel is disinfected by a station's crew, there would be no objection to the vessel's being brought immediately to the port by another fresh crew which has not been subjected to contact with the vessel or any of its regular crew or engaged in disinfection. In other words, as soon as a vessel has been thoroughly disinfected it is safe, but its regular crew may develop yellow fever even three or four days after completion of disinfection; in fact, they are more likely to, inasmuch as the dunnage of the crew has been opened in the process of disinfection.

I hope I have made these matters plain, and, if not, I would be pleased to answer any other questions you may ask regarding them.

The special regulations relating to passenger traffic, fruit vessels, and vessels of the United States Navy have been mentioned in the preceding article.

POST-EPIDEMIC DISINFECTION.

CIRCULAR LETTER RELATING TO RECORDS.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL
MARINE-HOSPITAL SERVICE,
Washington, D. C., October 11, 1897.

To the Medical Officers of the Marine-Hospital Service, Acting Assistant Surgeons, and State and Municipal Health Officers:

Anticipating the work of post epidemic disinfection, which will be necessary to prevent the recurrence of yellow fever next season, your attention is called to the importance of keeping a record of each person contracting yellow fever, and the street number of each house where the fever occurs.

WALTER WYMAN,
Supervising Surgeon-General, Marine-Hospital Service.

CIRCULAR LETTER RELATING TO POST EPIDEMIC DISINFECTION AND AERATION.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON GENERAL
MARINE-HOSPITAL SERVICE,
Washington, D. C., December 1, 1897.

To Commissioned Officers of the Marine-Hospital Service, Acting Assistant Surgeons, and State and Municipal Health Officers:

Referring to circular letter issued by this Bureau October 11, 1897, in which attention was called to the importance of keeping a record of the name of each person contracting yellow fever, and the street and number of each house where yellow fever occurred, I have to state that inasmuch as the fever has disappeared in the South, it is now deemed necessary to begin the work of post epidemic disinfection. In order that the same may be uniform and thorough in its character the following plan is recommended:

HOUSE-TO-HOUSE INSPECTION.

(a) The medical officer in command shall make, or cause to be made, house-to house inspection of all infected localities, and obtain complete

lists (giving number and street when practicable) of all buildings, whether private dwellings, public houses, or hospitals, in which yellow fever occurred or where suspicious disease existed during the past summer and fall—the city or town to be divided into districts.

(b) This inspection should be made by competent sanitary officers, under direction of the medical officer in command, and every part of the premises must be carefully inspected, including the rooms, basements, cellars, passages, closets, and garrets, the sinks, drains, cess-pools, latrines, privies or water-closets, the stables, sheds, outhouses, pens, etc.

(c) The inspection is not only for the purposes of disinfection, but also is intended to place each house and its surroundings in a perfectly sanitary condition, and includes the inspection of all streets, alleys, and byways.

(d) The inspection should include an examination into the water supply, and particularly as to the proximity of wells, cisterns, and springs to the privies, stables, pens, and other suspicious surroundings.

LIST OF YELLOW FEVER SUFFERERS AND SUSPECTS.

Make a complete list of all persons exposed to, or who may have contracted the disease, with the result in each case.

(a) If death resulted, where buried and under what precautions.

(b) If recovered or removed to another domicile in the same city, town, or place (or if departed from the neighborhood), ascertain all facts and make note of the same in order that it may be determined what action shall be taken in each case.

GENERAL DISINFECTION.

(a) It is recommended that after the inspection above provided for has been made the medical officer shall designate a competent sanitary officer to perform the thorough disinfection and cleansing of all houses and premises which he may have decided require the same, said disinfection to begin as soon as practicable after the inspection referred to has been made in any locality.

(b) It is recommended that the removal of all refuse, garbage, and other deleterious matter be included in the work of disinfection, and that all articles of little value, such as old rags and other accumulations of worthless material, be destroyed, whether found in dwellings or "slop-shops."

(c) It is recommended that the inspectors inform all parties whose houses are visited that no injury to their houses or contents will result from the disinfection contemplated, that even the most delicate fabrics can now be rendered free from contagion by a harmless process of disinfection, and that it is absolutely necessary for the protection of themselves and the community in which they live.

DISINFECTION OF HOUSES.

(a) The use of formaldehyd generators or lamps is recommended for the disinfection of houses and their contents. The details of their management for generating and applying formaldehyd gas should be fully understood by the sanitary officers in charge of the work.

(b) All the contents of the houses, including wearing apparel of every description, should be spread about the rooms; bedding or mattresses not used by the sick should be placed upon the chairs or tables, or, better still, hung up in the yards and beaten: soiled bedding and mattresses used by the sick should be steamed or destroyed; trunks, closets, and bureau drawers, and all closed receptacles should be opened and their contents exposed.

AERATION.

Both before and after disinfection the houses should be opened and thoroughly aired—"chilled," if the weather is favorable—and later on all the rooms, closets, etc., should be exposed to several hours of airing during freezing weather, and repeated at intervals during the winter.

DISINFECTION OF STABLES, PENS, ETC.

The use of bichloride of mercury solution, 1:500, or carbolic acid solution, 50 parts to 1,000 parts (applied by means of a spray), is deemed sufficient if all exposed surfaces are completely saturated. Privies may be disinfected by chloride of lime or strong solution of carbolic acid.

WALTER WYMAN,
Supervising Surgeon-General.

PRESENT STATUS OF THE BACTERIOLOGY OF YELLOW FEVER.

By P. A. Surg. E. K. SPRAGUE.

Unsatisfactory as bacteriological research thus far has proved in yellow fever, so much labor has been expended in that direction that it can not be passed over in silence. In no other disease have false hopes as to the discovery of the microbic cause been so frequently raised.

In 1885 Dr. Domingos Freire* announced the discovery of an organism in the blood of yellow fever patients to which he gave the name *cryptococcus xanthogenicus*. Considerable interest attached itself to this coccus from the fact that it was claimed, and many at the time believed, that inoculations with attenuated cultures would confer immunity to yellow fever. Several thousand submitted themselves to this treatment during 1884, 1885, and 1886, and while I have been able to find only one death, reported by Baron de Ibituruna,† resulting directly from the inoculation, there is not the slightest evidence that immunity to yellow fever followed from its use. When we consider the statement of Sternberg‡ that Freire worked with mixed cultures of undetermined organisms, it is very remarkable that his inoculations were as harmless as they proved themselves. A flask, supposed to be a pure culture of the cryptococcus, was found not to contain that organism, and an examination of some of the vaccination material gave the same negative result, but in both there were several other distinct microbic species. A culture which Freire brought from Paris proved to be a coccus differing in no essential from *staphylococcus pyogenes aureus*.

Dr. Lacerda, also of Rio de Janeiro, had previously found microorganisms in the liver and kidneys of yellow fever cadavers, and he sent some of the material to Babes§ for examination. This distinguished observer found bacilli in the given specimens, but in tissues from all other well diagnosticated cases he failed to find Lacerda's bacillus, and he gave no support to the claim that it was the cause of yellow fever.

* Freire, *Doctrine microbienne de la fièvre jaune*, Rio de Janeiro, 1885.

† Baron de Ibituruna, *Annual Report United States Marine-Hospital Service*, 1889, p. 187.

‡ Sternberg, *Annual Report United States Marine-Hospital Service*, 1889, p. 147.

§ Babes, *Les Bacteries*, Paris, 1890, Vol. II, p. 154.

In 1885 the announcement of Dr. Manuel Carmona* y Valle of the discovery of the *peronospora lutea* and of its etiological relationship with yellow fever was presented for the consideration of the scientific world. He maintained that the spores of this organism gave birth to a *mucédinée*, which, entering the human economy, in turn gave rise to the disease, and later was transformed into the *peronospora lutea*. He practiced preventive inoculations, using the residue, after evaporation, of urine in which the organism was found. The results were what would be expected from such an unscientific procedure as the inoculation of the dried salts and organisms from decomposing urine.

In 1887, Gibier,† at Havana, isolated from the contents of stomach and intestines a liquefying bacillus, which, although not constantly present in yellow-fever cadavers, was nevertheless heralded by its discoverer as the direct cause of the malady. As an evidence of the causative relation of this microbe to the disease, he stated that there appeared a black sediment in liquid cultures after twenty-four hours. This pigment, he said, gave the characteristic appearance to the contents of the stomach and intestines. None of the subsequent disinterested observers were able to confirm this remarkable peculiarity of the bacillus. It was pathogenic for mice and guinea pigs, but the post-mortem lesions bore little, if any, resemblance to those of yellow fever.

That same year Dr. Carlos Finlay‡ obtained from the blood and blister serum of yellow-fever patients an organism to which he gave the name *micrococcus tetragenus febris flavæ*, and which he claimed stood in an etiological relation to the disease in question. A few months later Kinyoun§ found this coccus on the skin of those sick with malarial fever, hailing all the way from Portland, Me., to Vera Cruz, Mexico. A little later Finlay abandoned his earlier claims.

In a summary of an investigation which included all the previously mentioned organisms, Sternberg|| says:

Among the microorganisms encountered there is not one which by its constant presence and special pathogenic power can be shown indisputably to be the specific infectious agent in the disease.

About a year ago Havelburg,¶ by a method similar to that employed by Gibier, viz, by inoculating guinea pigs with the contents of the stomach or intestines, succeeded in isolating a bacillus for which the usual claims were made. In his description of the organism, although he goes to some length into the differentiation, it is difficult to see why it should not be classed in the colon group, and indeed most bacteri-

* Carmona, Leçons sur l'etiologie et la prophylaxie de la fièvre jaune, Mexico, 1885.

† Gibier, Gaillard's Medical Journal, New York, 1889, Vol. VII, p. 130.

‡ Finlay, Annual Report, United States Marine-Hospital Service, 1889, p. 229.

§ Kinyoun, Annual Report, United States Marine-Hospital Service, 1889, p. 105.

|| Sternberg, Report on the Etiology and Prevention of Yellow Fever, 1890, p. 13.

¶ Havelburg, Public Health Reports, Vol. XII, 1897, p. 795.

ologists who have studied this bacillus regard that as the proper classification.

In February, 1896, Sanarelli* discovered the "*bacillus icteroides*," and since its announcement to the scientific world the opinions of competent observers have been divided as to the true etiological rôle of this organism.

Sanarelli himself is unable to find this bacillus in all of his cases—only in 58 per cent—but an ingenious explanation of this lack of success in constantly finding the bacillus is adduced by Sanarelli, who states that in laboratory experiments icteroides are quickly overrun and killed by the common pus organisms, the colon bacillus, and other bacterial inhabitants of the intestines. He therefore concludes that these last-mentioned organisms, having gained entrance to the circulation through the destruction of the natural barrier by degenerative changes wrought by icteroides, proceed at once to kill the first invaders.

By inoculations he has produced a disease in animals very closely resembling yellow fever, but the analogy is hardly strong enough, nor do the symptoms and pathological changes differ sufficiently from those produced by other organisms, notably bacillus "X," Sternberg, to warrant the conclusion that the disease actually has been produced. He further states that serum from convalescents or from yellow-fever cadavers produces only slight agglutination of bacillus icteroides. Other observers† have made much bolder claims for the agglutinative powers of serum from the above sources. Strange to say, antidiphtheritic serum produces rapid agglutination of the bacillus, which would indicate a close biological relationship between it and the Klebs-Loeffler bacillus. Indeed, there are points of resemblance in the manner in which the infection of yellow fever and diphtheria spread. Typhoid serum also produces this phenomenon but partially, and, as would naturally be expected, colon serum and that from normal man and other animals produces no effect.

Serum from a convalescent from yellow-fever possesses no curative action when injected into the guinea pig simultaneously with the minimum fatal dose of icteroides, but 2 c. c. of the same serum administered twenty-four hours previous to the minimum fatal dose seems to confer immunity; at least, the pig does not die.

A horse has been immunized to the bacillus icteroides and 0.5 c. c. of his serum will give to the guinea pig the immunity above mentioned under the same conditions, and even after forty-eight hours have been allowed to elapse 2 c. c. will save the animal.

The following is the result of treatment of cases of yellow fever with Sanarelli's‡ antiamarylic serum, conducted by himself. He used the

* Sanarelli, *Annales de L'Institut Pasteur*, XI, p. 438, 1897.

† Archinard, *New Orleans Med. and Surg. Jour.*, Vol. L, p. 455, 1898.

‡ Sanarelli: *Annales de l'Institut Pasteur*, Vol. XII, p. 348, 1898.

serum of a horse inoculated with gradually increasing quantities of the icteroid bacillus for eighteen months. At San Carlos do Pinhal, Brazil, he treated eight cases with subcutaneous injections, the total quantity administered varying from 15 c. c. to 65 c. c., with a mortality of two. Another series of fourteen cases was treated by the "intensive method" or intravenous injections, four of whom died.

Dr. Seidl had previously treated eight cases in San Sebastian Hospital, Rio de Janeiro, with serum sent him by Sanarelli, with four deaths. During the treatment of the cases at San Carlos, three convicts were stricken with the fever in the local prison. All the other inmates received prophylactic inoculations of the serum and the threatened invasion of the institution was promptly arrested, no more cases appearing. Unfortunately, no mention is made of the number thus protected, nor have we any knowledge of their previous history, although it is stated that many of them were foreigners; that their physiological condition and the hygiene of the prison left much to be desired, and that they ought to be considered as very susceptible to the disease.

The apparent lack of success that has thus far attended the treatment of yellow fever with anti-malarial serum constitutes no argument against the bacillus as the cause of the disease, because, as is well known, there are yet many diseases in which the microbic cause is incontestably established, but for which we are still unable to procure a specific curative serum.

If all the postulates formulated by Koch as necessary to prove the etiological rôle of an organism in the production of a disease have not been fulfilled by bacillus icteroides in connection with yellow fever, the demand of one is possibly met in the fact that this organism has not yet been found, save in the bodies of those sick with or dead from the malady.

If we are not at all prepared to accept the claims of Sanarelli in their entirety, the future, nevertheless, is bright with hope.

Many able and conscientious investigators are working to verify the researches of Sanarelli, and should they not be successful in their aim there is every reason to expect that their labors will sooner or later solve the vexed problem.

ON THE VALUE OF THE AUTOPSIC FINDINGS IN CASES THAT HAVE DIED OF SUSPECTED YELLOW FEVER.

By P. A. Surg. EUGENE WASDIN.

The history of this acute infectious disease establishes clearly the fact that it has been, and continues to be, of absorbing interest to all who have come in contact with it, because of the obscurity which has always enshrouded its etiology, the comparative difficulty in diagnosis, and the varying severity of the disease during different epidemics and in different localities. Naturally the question of its diagnosis, upon which depends very frequently the safety of large communities from its ravages, and, per contra, the integrity of commercial relations between a suspected place and other reactive centers, is a most important one. For many years the external appearance of the dead body, and that of the internal organs, has been accounted of great value to the diagnostician; and it is of the comparative value of such appearances to one called upon to make a decision under such conditions that this paper treats.

The yellow-fever cadaver has assuredly a most characteristic appearance. All bodies dead of the disease bear a close resemblance to each other; indeed, it would not be difficult to make a diagnosis, other facts being favorable thereto, from the cadaver alone. The body is usually quite rigid, this change in the muscles coming on early and persisting. The color is invariably more or less intensely yellow, and is due to a mixed hepatogenous and hematogenous jaundice. The entire skin is tinted, the scalp usually giving a startling contrast with the parted hair; the whites of the eyes are yellow, the change taking place in the conjunctivæ early in the disease, the scleræ becoming tinted later. This yellow tint is always contrasted with the deep purple discolorations from hypostasis which quickly appear in the skin of the dependent portions of the body after, but which frequently appear before, death. It is at the edges of these hypostatic areas that the mixture of biliary and blood jaundice is particularly noticed, as a muddy, thick, grayish-yellow tone. Hypostasis is common in all cadavers, but particularly is it prominent in this disease. It is not confined to the lower portions of the body, as the buttocks, loins, and shoulders, but invades

the neck, chest, ears, and face; the genitals, as a rule, and the finger and toe nails are of a deep purple color. This discoloration occurs quickly and is prominent in an hour post-mortem. The pupils are usually dilated; the tongue foul, or, like the gums, bloody; the anterior nares are caked with blood. This is a picture of a typical cadaver, and the appearances may be accentuated or softened, but the characteristic ensemble will be present in all. During my recent stay in the city of Havana, I was called upon by Dr. Curto, of the staff of the military hospital, Alphonso the XIII, to decide the presence of yellow fever in a cadaver three hours post-mortem. The body was quite yellow and there was hypostasis, but it lacked the characteristic appearance, and section showed indubitable evidence of malarial toxemia of long standing.

My experience, from autopsies of cases of malarial fever in the South, teaches that there are externally many points of resemblance in them to the yellow-fever cadaver, and at times I feel assured the decision between them would be very difficult or impossible. Dependence must then be placed upon the conditions found in the internal organs. Section shows deep yellow tinting of the superficial tissues and the peritoneum; a dryness of these tissues; a glazed appearance of the intestines, which are dry and sticky to the touch, and a deep-tinted peritoneal fluid. The organs are of a yellow tint, ranging from light to deep saffron. The omentum is deeply congested, the dilated, purple veins contrasting with the general tint. The spleen is usually of normal size and appearance; any deviation suggests preceding or complicating disease. The kidneys are always congested and swollen; the stellate veins of the capsule are prominent; the capsule itself is not influenced by the disease; frequently there are extravasations upon the cortical surface. Incision of the organs shows congestion of the renal veins, yet the general appearance is pale; the cortex is swollen, its markings usually obscured, and at the bases of the pyramids of Malpighi there are seen pale yellow fatty areas. These are very generally seen, and in cases of long duration a general fatty appearance is present.

I would attract especial attention to these fatty areas about the base of the pyramids within the cortex, for they can be seen when the kidney otherwise appears free from fatty change. The adrenals are normal. The urinary bladder is usually empty from anuria; its mucosa may present extravasations; in one case only have I known bloody urine from such extravasation. The mesentery is always typically congested, yet I have but rarely seen extravasation in its layers; the congestion is more marked in the reflection upon the duodenum. The liver, long considered the pathognomonic organ, may or may not be normal in size, but any deviation from the normal I consider dependent upon some other cause, for if the histology be considered it will be seen that upon the increased amount of blood in the vessels depends any

increase, while the termination of the disease must anticipate noticeable decrease in its size from absorption of the fatty detritus. I have usually found the organ normal in size. The gall bladder is generally empty, owing to intraabdominal pressure from vomiting and decreased secretion, but may contain a normal amount of bile. The color of the organ varies from a light buff or "boxwood" to a dark brown, this seeming to depend upon the amount of congestion, the left lobe and upper portions being as a rule lighter in color than the right and more dependent portions, the posterior surface being a dark blue from stasis. At times this fatty appearance is diffuse, and again there may be only plaques of yellow upon the surface or throughout the organ.

A frequent appearance is that of the so-called "nutmeg" liver, the yellow points contrasting with the red lines about them. Upon section, the liver, if not the subject of preceding disease, presents a normally firm resistance; is of firm consistence; at times friable and dry; of a pale yellow color, and imparts to the blade a greasy stain. The portal vessels are full of dark fluid blood, which quickly changes to carmine on exposure to the air. The venous radicles are distended, the adjacent parenchyma showing fatty change, and this contrast results in the "nutmeg" appearance. The smaller bile ducts are empty. The capsule is normal. The vessels of the stomach walls are congested, also those of the omental reflections. The stomach may contain more or less blood-stained fluid, which, if exposed to the acid secretion for some time, may have the "coffee grounds" appearance. Frequently the content is a thick, glairy, grayish mucus which clings to the mucosa. The mucosa itself is invariably thickened, swollen, and presents numerous patches of extravasation and shallow erosions. While the entire membrane may be affected, the changes are more marked on the anterior surface and near the pylorus, the membrane here presenting a deep port-wine stain from diffuse extravasation, and often evidence of free hemorrhage.

If many hours have elapsed between demise and autopsy the membrane will be found much softened and with many erosions from post-mortem change. The vessels of the duodenum are engorged; the mucosa is swollen, eroded, and hemorrhagic; in some instances it contains black, grumous blood from which the stomach was free. The mucosa of the entire canal may present evidences of ante-mortem congestion in the form of minute extravasations. In the female there may be extravasations in the ovaries, or in the mucosa of the tubes and uterus. The vessels are prominent on the surface of the diaphragm. Within the thorax the general yellow tint prevails, there being nothing notable about the lungs save congestion; the pleuræ frequently present ecchymoses; the pericardium also is frequently ecchymotic both visceral and parietal; the heart is usually in diastole, or the left ventricle may be rigidly contracted from change in the muscle, the right being always dilated with dark fluid blood. There is always present a very notable

congestion of the vasa vasorum of the great vessels at the base of the heart, these minute vessels forming a delicate tracery over their serosa and upon the walls of the auricles, with at times minute ecchymoses. I deem this a very constant and characteristic appearance. The heart muscle does not show fatty changes very often to the unaided eye. The fluids of pericardium and pleuræ are yellow. The changes in the brain and its membranes are those of intense congestion, the fluid of the ventricles being yellow, and there may be extravasations. Such are the findings in a typical yellow-fever cadaver.

It is sometimes said that a yellow-fever autopsy is a bloodless one, but this expression must have arisen because of the limited scope of many hastily made sections, which consisted in an exposure of the liver and its incision, the extraction of a kidney, and the exploration of the stomach in situ. In reality, the full influence of the toxin is felt upon the vasomotor system, and results in an incomparable congestion of the vessels of the abdomen, and when complete the section presents an appearance quite the reverse. A study of the histopathology of the organs must be limited to the examination of fresh sections from the liver and kidneys, for in these the fatty changes are best seen; the liver cells are more granular, stain more faintly, and contain numerous fat droplets; those of the kidneys lining the tubules, especially of the cortex, are also filled with drops of fat. These gross changes are readily detected, and if facilities are at hand they should be sought for. But the importance of an immediate diagnosis will have long passed before the finer histologic changes may be observed. I have said that the above appearances are constant in the cadaver of yellow fever. The question then arises as to their diagnostic value. Is it possible to arrive at definite conclusions from an isolated case presenting all of these signs? Would we be justified in such cases either in withholding quarantine protection from a community or in initiating quarantine to the possible detriment to commerce? The last phase of the question is a most important one, and at times exercises as much influence as the first.

From recent observation I feel safe in asserting that it is not possible to diagnose this disease from the appearances and the gross microscopic findings alone. I do not undervalue their importance, when taken in due consideration with the history of the case, the clinical charts, and the history of albuminuria, in assisting to form an opinion, but in the absence of these accompanying facts they are not sufficient to name the disease, although a diagnosis may be safely ventured in the absence of any other known cause of infection. Just here I will venture tentatively upon the question of etiology, as having a direct bearing upon what has been said. All observers in this field have recorded the presence of the bacillus coli communis in its many forms in the blood of patients living, and more freely in the blood and tissues of those dead from yellow fever. Sternberg in 1889 discovered, among

other forms in the tissues of such patients, a bacillus of such peculiar physiologic and vegetative characteristics that he assumed for it a distinctive position among these organisms and, from its influence upon animals, a possible etiologic value in this disease. This was the Bacillus "X." In 1897 Sanarelli, of the University of Montevideo, published the discovery of a bacillus supposed to cause the disease—his Bacillus "Feteroides." These organisms present many similar features of growth and chemic reaction, yet there are sufficient distinguishing characteristics to insure them separate places in the group of colon organisms, for, during my observations upon these and other organisms from yellow-fever cases, it became evident that the former belonged to this group and it appeared probable that the bacillus of Sanarelli was also to be classed among them.

On September 28, 1897, it was my privilege to observe a case of yellow fever at the isolation division of the Marine-Hospital Service detention camp at Fontainebleau, Miss., in the person of one Goodrich, and from cultures from his blood, on the fourth day of the disease (which was well marked), to isolate a bacillus, which corresponded to that of Sanarelli, from a contaminating colon bacillus. This was designated Bacillus "Goodrich," and was esteemed the first organism isolated after Sanarelli in this country. Later, in the city of Havana and in concert with my colleague, P. A. Surg. H. D. Geddings, United States Marine-Hospital Service, this bacillus was isolated from a number of cultures taken at autopsy from cases in the isolation hospital in New Orleans during the epidemic of last year. Besides the organisms isolated by us from these native sources, it was our privilege to study a limited number of cases of yellow fever in the military hospitals of Havana, and in 60 per cent of these we isolated the same bacillus. In all of these instances this organism maintained its distinctive characteristics from the Bacillus "X."

Experimental inoculation with these organisms were usually fatal to animals, which exhibited more or less pronounced, rapid, or prolonged symptoms of intoxication, but necropsy always gave similar appearances in the different organs. As an example, I give the notes from an autopsy. "Pig No. 2, white female, weight 525 grams, was injected intraperitoneally with 7 c. c. of a twenty-four hour bouillon culture of Bacillus 'Goodrich,' at 3 p. m. on the 9th of February, 1898. On the morning of the 10th the animal exhibits evidence of distress, does not eat, remains crouched in cage, abdomen tender; temperature, 37.3; respiration, 80. At 3 p. m. the animal is quite ill and has lost 42 grams in weight. At 9 a. m. on the 11th it died. Necropsy immediate. Body still warm; heart first exposed, in diastole and full of dark fluid blood; the vasa vasorum distended over the great vessels at the base; pericardium and fluid slightly tinted. The liver is congested with numerous plaques of a yellowish-white fatty appearance; when incised this fatty appearance is general. The spleen is slightly increased in size

and congested. The kidneys much congested and swollen. The urinary bladder contains 6 c. c. of urine which, by the cold nitric acid test, gives a dense 'ring' of albumen, and which is also shown with heat and nitric acid. Peritoneum not inflamed, some injection at the point of puncture to left of median line; in the left iliac fossa there is a small quantity of cloudy fluid localized. Mesentery normal save an intense engorgement of its vessels, especially in its duodenal reflection. In the stomach the mucosa is congested, thickened, and softened, especially about the pylorus; that of the duodenum much congested with numerous small extravasations, but no free hemorrhage. Cultures from blood of organs and from the fluid from the fossa give after twenty-four hours colonies only from the latter. This is a pure culture of the inoculating organism. After forty-eight hours tubes from the left pleural fluid also exhibit colonies of this organism in pure culture, the spleen also giving a colony from contamination. Cover preparations show only a small characteristic rod in pure culture from the fluid in the iliac fossa."

In this case there was no free blood in the stomach or bowel, but in the very next of my series there is this note: "Mucosa (stomach) injected, and near the pylorus there are ecchymoses, and at one point at least there is free hemorrhage, which has stained the food mass a dark or black color; this looks like 'coffee grounds.'" This experience has been that of many other observers. These organisms elaborate a toxin which exerts a characteristic and powerful influence upon the vasomotor system, as evidenced in the intense engorgement of the vessels, the gaseous, toneless pulse, and the full diastolic heart, prior to and post-mortem; also in that rapid metamorphosis of the albuminoids of the highly organized cells of the liver and kidneys. The intention is not to contrast these organisms, but to accentuate the fact that there is no constant sign at these autopsies by which we can name the particular one which has produced the disease.

Here I will revert to the subject proper, the value of these post-mortem appearances in the human body. And again I must refer to notes kindly furnished me by Dr. B. E. Baker, of the army general hospital at Key West, Fla., in order to illustrate their value. The U. S. S. *Yankee*, cruising on the southern coast of Cuba during June, 1898, entered Key West Harbor. She sent to hospital a seaman ill for one week with appendicitis. Her officers later stated that a few Cubans had been entertained on board during this time, and that several boats' crews had been sent on board of captured vessels for the purpose of destroying them, but that no baggage or effects had been allowed on the vessel excepting four dogs and a few machetes. On the third day after entering hospital and the second after operation for appendicial abscess, the patient developed high fever, became delirious, and died on the fourth, the entire illness being about ten days. Prior to death the acute exacerbation (the temperature having fallen to normal after the operation) and the mental symptoms attracted attention. The skin

was noticed to be jaundiced and suffused, as were the eyes. Urine contained no albumen at this time, but found to contain it after death. At autopsy the general appearance of the body impressed the operator, Dr. Baker, with the probability of its being the subject of yellow fever, and I was asked in consultation. After a careful examination of the body and organs I concurred in the diagnosis of yellow fever.

Necropsy (made five hours post-mortem): White male adult, poorly nourished; rigor marked; conjunctivæ slightly jaundiced; pupils normal; post-mortem lividity on back and neck and dependent portions of the body, on scrotum and prepuce; the face, neck, and anterior portions of trunk a bronze-yellow color, not so marked on the legs. On section there is about 12 c. c. of clear bile-stained fluid in the pericardial sac; the membrane contains a few ecchymotic spots in its reflection over the diaphragm; the visceral reflection also is ecchymotic, and presents extravasations of blood well marked at the base of ventricles; the vasa vasorum distended; the heart normal in size; the left ventricle contains small amount of soft blood clot; the right auricle and ventricle distended with dark fluid blood; valves competent; muscle is pale and yellowish; aorta tinted, some atheroma about valves. The pleura shows old adhesions; the lungs are normal. The abdominal cavity is dry; the intestines sticky; the mesentery and the omentum show ecchymotic patches; the glands are enlarged. The spleen is normal in size and color. The kidneys are slightly increased in size, congested, the stellate veins of the capsule well marked; the inner edges of the cortex, near the bases of the malpighian pyramids, show a yellowish tinge; supra renal bodies normal. The liver is normal in size, of typical "nutmeg" appearance, with lemon-yellow areas and spots scattered over the surface; the gall bladder contains 45 c. c. of thick greenish-black bile. On section the liver presents a typical "nutmeg" appearance, and much congestion. The stomach is somewhat dilated, and contains 250 c. c. of brownish-black fluid with brown granules; the mucosa is congested throughout, but especially on the posterior wall near the cardiac extremity. (When washed there were great plaques of deep wine-colored extravasation and numerous erosions.) The mucosa of the duodenum is ecchymotic and there is free hemorrhage in the form of black vomit. The last inch of the ileum is bound down by adhesions, as are the caput coli and the cœcum. On freeing the gut a small abscess cavity is seen between it and the abdominal wall, in which is the vermiform appendix, with a slough in its distal portion, the upper two-thirds being normal. (This cavity was drained through an incision through the abdominal wall.)

In this case there was no doubt in my mind that death had been caused by infection with one of the organisms of the group already named; but with which one? Here there was an acute appendicitis, with localized abscess and perfect drainage. Was it clear that death had taken place from a general infection from the colon group? Not

at all, for this patient had been possibly, or probably, exposed to the infection of yellow fever through the presence on board his ship of persons who may have conveyed infection in their clothing. The time elapsed since such possible exposure was about the incubation period of the disease. If we assume that the fever developed in hospital, it must have been contracted on the ship, since there has been no yellow fever in this city during this season. In this remarkable case, remarkable because of the element in it of serious possibility, amounting to probability, of exposure to the infection of yellow fever, contrasted with the fact of local, if not a general, infection with the bacillus coli communis, I concurred in the diagnosis of death from yellow fever honestly, for this was a yellow-fever cadaver, as we know them from external appearance and anatomical facts. However, I am now convinced that it was simply an intoxication from autoinfection with some member of the colon group of organisms. For, notwithstanding the fact that the crew of the *Yankee* was composed of young Northern men, the New York Naval Reserve, and that the surgeons, nurses, attendants, and neighboring patients were reagents, there has been no sequel to the case, nor is it reasonable to assume that this seaman, ill in his cot from appendicitis, should have been the only one of all the reagents on this ship to have contracted the possible infection.

The city of Key West is the base of naval operations against Spain. Its poor sanitary condition, the presence of a large number of non-immune residents, and the necessity of keeping the base open, all seemed to me to demand the diagnosis which we made; for under the circumstances the only harm possible would be the restraint placed upon the inmates of the hospital for the prescribed time and extra vigilance upon the part of the medical officer on board the ship. Only a few minutes after the post-mortem one of the medical officers, a reagent, asked me: "How much danger of infection have I risked from my presence at the operation upon this case and my having visited it several times since?" I replied: "None, provided this man has not come into contact with the infecting agent of yellow fever." Moreover, I felt willing to assume the responsibility, provided also all blame, in continuing the routine of the hospital without other restraint than strict vigilance until some sequel demanded its isolation. However, was the autopsy in this case of material assistance of itself? In the absence of any history of possible infection, could anyone familiar with the appearances in the organs of animals killed with the organisms mentioned, and comparing these with those found in yellow-fever organs in man, have unhesitatingly decided in this case? Yellow fever clinically studied has impressed many observers, since I have heard it frequently expressed among the profession in Southern cities that it is a disease in which probably two etiologic factors are present—the primary, or external agency, giving rise to the initial symptoms of the disease, and a secondary, or internal agent, of autoinfection.

Is it not possible, from what has been shown, that the autoinfection may be productive of the autopsic appearances? This view of the disease is reasonable, but not yet proved; nor will it be until the indubitable cause of yellow fever is discovered; that is, an agent which not only can give rise to the appearances of yellow fever, especially post-mortem, but can, as in the case of bacillus diphtheriæ, give rise to an acute dissemination of the disease among those who are reagents. This has not been demonstrated either in the case of the Bacillus "X" or of Bacillus "Icteroides." We should not hastily decide upon the etiologic value of an organism, so closely allied to the colon group as are the two named, from the influence exercised upon the sick by the exhibition of its antiserum, but depend rather upon its power to reproduce the disease, "catching" from person to person and of the antiserum to prevent such infections. Finally, I would suggest that typical autopsic findings should always be regarded with suspicion and demand immediate investigation of their cause. Should there be or not any local center of autoinfection, there should be an investigation of the immediately preceding history of the patient, and should there prove to be evidence of exposure to infection of yellow fever, and should the clinical charts and history present the evidences of the disease which we have learned to recognize, then, and only then, can the information gained post-mortem be of decisive value to the diagnostician.

TRAIN INSPECTION.

A contributed article-by Surg. H. R. CARTER, prepared at the close of the epidemic of 1898.

COMMUNICATING, NEUTRAL, AND DRIFT TERRITORY.

It is not proposed to go into the general question of passenger traffic on railroads from and contiguous to a place infected with yellow fever, but simply to present a few points in train inspection and its necessary adjuncts, which, in spite of the fact that they have been in use more or less completely by this Service since 1893, and, indeed, in principle since 1888, seem to be not thoroughly appreciated.

To take the matter generally, let us suppose A to be an infected town,* with lines of railroad A. N. and A. S. running the one through to northern points and the other to a southern (infectible) terminal. Let the country around this town as far as X hold direct communication with it after quarantine is laid, and all beyond establish quarantine. Let that district not farther than V have held communication with it under such conditions that it has people in it who have recently been exposed to infection in A, and is suspected of containing foci of infection as yet unknown.

The problem is to organize the train inspection on these two roads for passenger traffic, through and local.

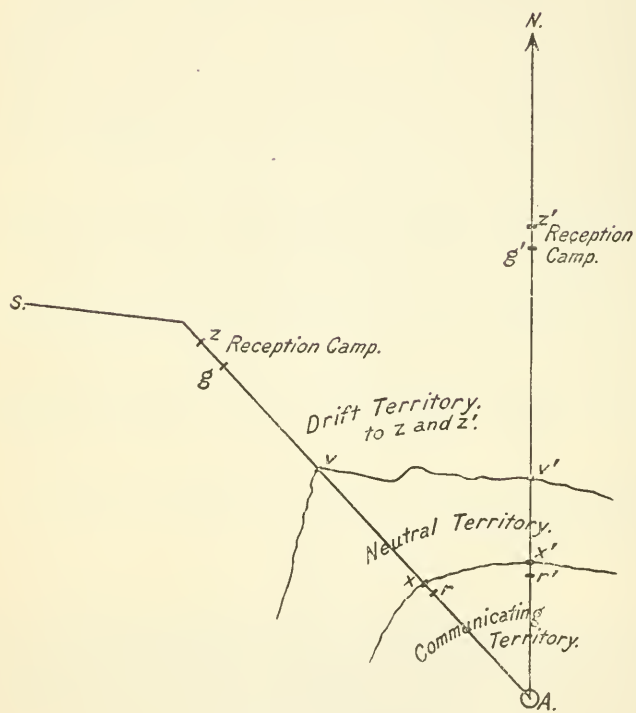
RELAY.

The relay of train crews should take place at R, the last station in the communicating territory. This is not absolutely necessary, as any siding near this limit will do—preferably on the proximal side. If an unoccupied siding be unobtainable, a small place certainly not infected, and kept inspected, will do.

If the communication between the city and the territory between it and X is unrestricted, there is obviously no need of an inspection on the train up to this place, because an inspector is needed only if there are restrictions to enforce. If this communication be hedged around with certain restrictions, however—"daylight," "disinfection of baggage," etc.—this inspection is needed to enforce it.

Passenger traffic beyond X must be allowed only under certain restrictions, and hence subject to inspection.

* See "Illustrative Diagram," page 442.



Illustrative Diagram.

RESTRICTIONS ON PASSENGER TRAFFIC.

This divides itself into permanent and temporary—that is, “pending investigation.”

From A to X to be determined by the nature of the communication agreed. Free communication to be allowed between all places between A and X if under the same rule of communication.

(1) No person to be allowed to pass from A north of X save immunes, etc. They would go only into infectible quarantined territory. There is no question, then, of “through passenger traffic” on this road.¹

(2) No passengers to be allowed to pass north of V save immunes, etc., “pending investigation.” For this the reason is obvious.

(3) No intercommunication to be allowed between places between X and V “pending investigation.” This is because we believe some place in this district is or may be infected, and that all are not. Obviously, then, until we can differentiate the clean from the infectep places communication from the latter to the former may infect a clean place.

(2) and (3). Taken together mean that, “pending investigation,” no passengers are allowed to board trains between X and V, and that the north-bound trains go empty into and through this district, unless, indeed, the train for the upper end of the road be made up north of this district.

When the investigation has shown, if it does show, that there is no focus of infection beyond X, this neutral territory disappears (or will disappear if sufficient pains are taken with quarantine), and the restrictions against travel therefrom enumerated above should be removed.

The conveyance by rail of infection beyond X is sufficiently provided for by the above rules. Now we believe that there is no infection or persons recently exposed to infection north of V, yet there is, or at least may be, always a certain number of people who will, by private conveyance or by walking, pass from south of V to places north of that point. This condition and the danger from it will be considerably increased if by going a moderate distance beyond the quarantine lines at V they can board the train and proceed to any destination they elect. This, then, is to be guarded against. It is done, so far as the train inspection is concerned, by requiring a “health certificate” of

¹It is a good general rule that people living in communicating territory, if infectible, should not be allowed freedom of travel in clean infectible territory. This is on account of the risk of foci of infection being established in the former and not being immediately recognized. Still, if we know that a place is free from infection, the fact of its holding direct communication with an infected place does not of itself render those leaving it liable to convey infection; they could be allowed to travel on a certificate of residence. Residents of Bay St. Louis, which place held direct “daylight” communication with New Orleans (but which was known to be free from infection), were allowed to enter Florida on certificates of residence, and this action was safe.

persons boarding trains beyond V. This "health certificate" is a misnomer and should be a "certificate of residence," because it witnesses that the holder has resided in a locality not quarantined against for not less than — (usually ten) days.

FORM OF HEALTH CERTIFICATE.

OFFICE OF BOARD OF HEALTH,
—, 189—.

Health Officer —.

To whom it may concern:

This is to certify that Mr. — has given satisfactory evidence to me that he has been in — not less than ten days, and to the best of my knowledge and belief he has not been exposed to the infection of yellow fever, and has not been in any infected or suspected locality for ten days.

Description: Age, — years; weight, — pounds; height, —; complexion, —; hair, —; eyes, —.

—,
Health Officer.

Signature: — —.

Obviously this excludes persons recently from south of V and gets rid of the transportation by rail of those going by private conveyance from this territory.

We can generally depend on the small towns and stations next to V forbidding people liable to convey infection going to them to remain, while they will frequently make no effort to prevent such people going to them to take the train, and this prohibition to board the trains acts to increase the vigilance of these places against the entrance of suspects. Also the knowledge that they can not board the trains even at places north of V enormously limits the choice of places to which people can go, and is thus very effective in preventing them from attempting to pass the quarantine lines.

How to insure that these certificates are true is a problem not to be considered here. Unless much pains be taken they may be very misleading; yet they can be made of great value.

From the reasons given for establishing this inspection it is clear it need not extend indefinitely up the road. It must cover the distance to which people south of V will go by private conveyance; it need not go beyond.

Let us suppose Z is beyond (certainly beyond) this distance. Health certificates (certificates of residence), then, will be required of all boarding trains between V and Z, and the inspector on the train must go so far and need not go beyond that point. This inspection will begin at A or at R, according to whether the communication with A of the "communicating territory" is limited or unlimited.

This territory into which people may come by private conveyance from quarantined territory has been called the "drift territory." Of course it may not exist, as there may be no neutral territory; an

efficient cordon around the quarantined district does away with it. I have not judged it safe to dispense with it in any epidemic I have seen, although it might have been dispensed with at Franklin and during the latter part of the quarantine at McHenry.

(4) Passengers from points between V and Z shall be allowed to board trains provided they have not been in quarantined territory for — days—i. e., those who can produce proper "health certificates."

(5) Beyond Z there should be no restriction in passenger traffic.

If this place V be at the crossing points of the north and south bound trains, it will be very convenient; one tier of inspectors will be enough. The same will be true if it be south of the crossing point, as they can go up on the north-bound train and return on the south bound, simply stepping from one train to another.

Notice to the railroad that only those presenting proof (generally specified as "health certificates") that they have not been in any place quarantined for — (ten) days are to be allowed to board trains as passengers between V and Z will result in the ticket agents along the lines demanding health certificates as a prerequisite to the sale of tickets. In general, then, those on board the trains will have the required evidence. If there were time for the train inspector to examine critically into this evidence prior to boarding it would be ideal. In general this causes unjustifiable delay to trains, and the ticket agent, where such exists, has already passed on the matter. A certain number, however, will be found boarding the train between these places who do not present satisfactory evidence on this point, and therefore can not be transported to other clean places. What is to be done with these people? The practice recently—and I think the proper disposition—is to keep them on the train to the end of the inspector's run. If this be the meeting point of the north and south bound trains, he can take them across to the south-bound train and carry them back. If the end of the run be not the meeting point of trains, there must be here a building or tents with necessary equipage, under guard—a reception camp or guard tents—where these people can be cared for in isolation and sent south with the inspector on the south-bound train. These people had best, if the inspector believes that they have been exposed to infection, be taken to detention camp. This was done for the few suspects of McHenry, who were very willing to go. Failing this, as was done most generally, they are taken back to the station at which they boarded the train. The health authorities having jurisdiction over this place should be notified in the meantime, and if there is good reason to believe that these people have illegally left the quarantined territory it will be found that they are by these health authorities forbidden to remain at this place and that they either ask to go to a detention camp or to go back to their homes in the quarantined section. It is this bringing back of suspects to the place at which they boarded the train which makes the ticket agent care-

fully inspect the evidence (health certificate) which these people present. After this thing happens more than once, there are very few roads which will retain such an agent without a very satisfactory explanation. I have found that after they come to appreciate this and have had a little experience ticket agents become most valuable allies in train-inspection service.

So much for the relays, the restrictions on passenger travel, and the local limits of the work of the officer who inspects the train.

INSPECTION OF TERRITORY.

It is obvious that when we accept certificates of residence (health certificates) from any place between V and Z we imply that this place is not infected. Also, that when we require a certificate from such a place we imply that persons capable of conveying infection may be at that place, if only to board the trains. These persons may possibly develop fever at this place and infect it. The country, then, between V and Z (drift territory) is predicated as clean, but liable to become infected. It is necessary, then, to have at all times authentic information of its sanitary condition, and it should be kept under inspection, to see that no place in it becomes infected without our knowing it. This is absolutely essential; else we will be taking health certificates from infected places and allowing people from such places to travel on them ad libitum, spreading infection.

This inspection of territory, then, is as much a part of train inspection, or rather regulation of passenger traffic on the lines from an infected town, as inspection of passengers on the train, which is imperfect without it.

It is obvious that the limits and, indeed existence, of a drift territory depends not on distance, but on the fact that persons from the quarantined territory pass up into it to certain distances unguarded, or insufficiently guarded, lines of communication.

If this, by proper quarantine measures, be prevented (by cordon or otherwise), there is of course no drift territory—a condition which seldom obtains—and, in proportion as it is rendered difficult, so will this territory become a small factor in our train inspection.

It will be seen that in some points this "drift territory" is the converse of the "neutral territory." From the latter we allow no egress until inspection has shown it to be free from infection and from persons liable to develop infection, when it indeed ceases to be neutral territory and inspection for that purpose ceases. For the former we allow egress as long as inspection shows that no place in it becomes infected, and inspection is to continue for this purpose as long as the territory keeps clean. In the one, inspection will remove or confirm suspicion of infection believed to exist. In the other, it is to confirm or deny a belief in the freedom from infection.

For the territory inspected, the inspection of neutral territory is frequently a great commercial advantage and generally welcomed; it is already in quarantine, and this inspection may relieve it. The inspection of the "drift" is absolutely essential for the sanitary protection of other places, but it may lead to quarantine of places in this territory, and is not generally regarded with special favor by the place inspected. Of the two, it is the more necessary.

Obviously it need not extend beyond Z, yet it may be (and usually is) advisable somewhat beyond. The inspector for this work, as for that of neutral territory, must be possessed of certain qualifications.

First. Must be skilled in the differential diagnosis of yellow fever, and of such reputation therein that his diagnosis of yellow fever, positive or negative, will be generally accepted, so as to leave as few disputes as possible as to the nature of the disease which he has pronounced on. No one's diagnosis will be universally accepted by the inhabitants of the town in which he declares yellow fever. Yet much opposition can be disarmed by conservatism, carefulness, and absolute good faith.

Second. He must be immune to yellow fever. Else should he discover an infected place his usefulness as inspector is destroyed, as he may not go from such a place into clean territory. Should he (non-immune) expose himself to infection and fail to recognize the disease, he becomes a source of danger to the community which he has inspected.

For a road of this nature, running only to infectible territory, this system is complete. It requires (1) relay of train crews, (2) inspection of territory, (3) train inspectors, (4) reception camp (guard tents).

All of this is necessary for a complete train inspection. Without the relay, crews of trains are liable to convey infection. The inspection of territory is needed to determine from what places people can be allowed passage. The train inspector is needed to prevent other people than those allowed from taking passage. The reception camp is needed to enable the train inspector to carry out his instructions without undue interference with the schedule of trains.

For the road A. N. it is obvious for the local passenger traffic that the same conditions exist as for A. S., and we establish our relays at R', mark X', V', and Z' as the limits of the "communicating," "neutral," and "drift" territory, and establish our inspection of territory, reception camps, and train inspectors just as needed before.

But as this road runs through to noninfectible territory which is not quarantined, we can allow through passenger traffic on it from A to Northern points. So far as the origin of passengers is concerned this can take place without any restriction, but we must provide that they do not stop in infectible territory; do not hold contaminating intercourse therein while passing through; do not return thereto until the period of incubation has passed, and do not then return with

fomites. Certain restrictions are necessary, then, affecting the mode of traveling.

The two first indications are fulfilled by sending the through passenger (refugees), under the care of a train inspector (train guard), who simply sees that they do not leave the train. There is little danger in allowing these people to ride in the same coach with local passengers, because people generally travel in clean clothes.¹ But it is customary to give them a train, or at least a coach, to themselves, and this is best; less to obviate the small risk of infection from the clothing of these people to those traveling with them than to enable the inspector to keep them from eluding him.²

Whether the same guard goes through from A to uninfectible territory or several relays of them operate together is a matter of no importance and is determined by convenience. Whether he is only a train guard having charge of these through passengers or whether to this he adds the duties of the train inspector for local traffic also depends upon the train service of the road. There is no need of shutting the windows of the train in passing through places if it be done to prevent them receiving infection from the air of the coach. Whether it is to be done to prevent things being thrown out of the window the guard and local authorities must judge.

At times this guard must be a physician, because if the time en route in noninfectable territory is long and the place is badly infected there will very generally be cases of yellow fever occurring en route. At such times it may be necessary to attach an extra coach as "hospital car." I think the latter will be not often needed. It is but seldom that the inspector for local traffic need be a physician.

Let us note that the functions of this train inspector (train guard) for through traffic are almost in contrast with those of the train inspector on the lines with only local traffic. The duty of the first is to prevent people from quarantined territory leaving the car in infectable territory; he is a guard, and nothing more. The duty of the latter is to prevent persons from quarantined territory boarding the cars in clean territory.

To prevent the return of these people (after we have conducted them north) to noninfectable territory until the period of incubation has passed, and to prevent return at all with fomites, is confessedly difficult; and to do so absolutely is to my mind impossible, while it can be

¹Passengers believed to be especially liable to convey infection are to be eliminated by the inspectors at A, who examine the affidavits. If found on the cars after they leave the relay, they can be either isolated abroad or returned.

²To be consistent, if this separation be required to avoid infection of those traveling with them, the train crew who enter the coaches should be required to be immune or isolated. I do not know of any member of a train crew who is suspected of having contracted yellow fever from his passengers.

hedged around with safeguards that bring it within the limits of safety given by other quarantine precautions. Of all persons boarding the train to go north affidavits that they "will not return to any place quarantined against A" or "will not return for ten days" is required. These are taken up by the guards or train inspectors. If the second form be the one presented the baggage of the passenger is disinfected and labeled, and a certificate to that effect given him. It is not claimed that an affidavit of this kind gives absolute protection, or even a very high degree of protection. Still, that it does give protection to some degree is shown by the very considerable proportion of those who subscribe to the second form, requiring the disinfection of baggage. This was always complained of; much more, it seems to me, than the inconvenience justified, and was submitted to rather than take the first form of affidavit.

A list of the passengers (giving date of arrival and if possible address) going to each principal place of reception of refugees, especially if these be distributing points for passenger traffic south, is made out daily from the list of train inspectors. This is to be furnished to the inspector stationed at such a place and by him furnished to the different ticket offices in that town.

A supervision of the ticket office at this place and requiring residence certificates of those purchasing tickets south will generally be sufficient to prevent most of this "back" travel. This can be supplemented by inspecting the roads leading south from such places. As stated before, it is not claimed that these methods give absolute protection, but it is believed that this is about all that can be done without unduly interfering with traffic, and is within the limits of safety established by other quarantine proceedings.

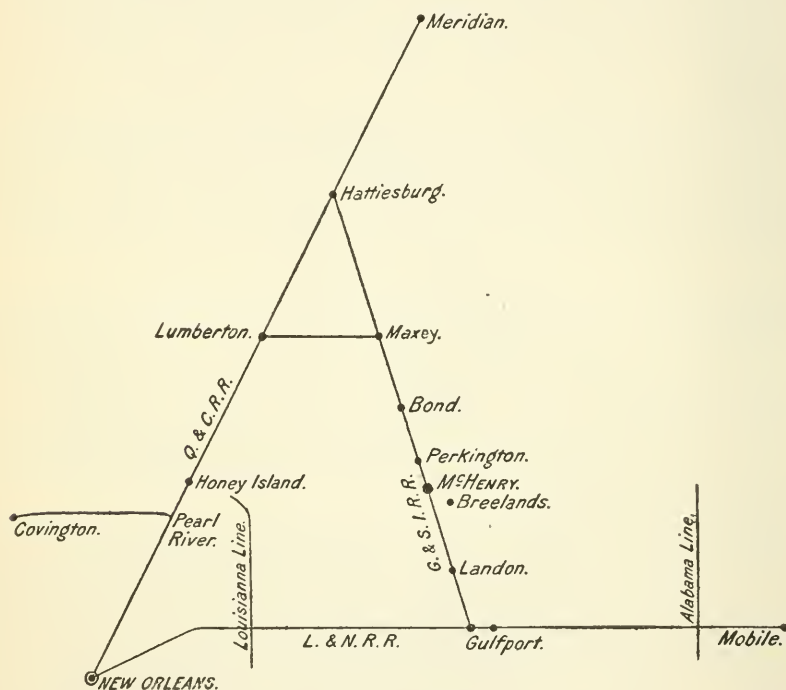
The disinfection of passenger coaches (used for through travel) before coming south again should also be mentioned as a part of this system. For reasons given it is not claimed to be a necessity, but it is advisable as is, though less so, the disinfection of baggage and mail cars either at the same time or at the infected place.—(YOUNG.)

Passenger traffic on lines crossing either of the above lines is obviously to be treated in accordance with the country it runs through and its terminal. If it passes through "drift" territory it will require inspection for local passenger traffic. If it runs to a noninfectable point, receiving refugees, we may allow transfer of refugees to this line if other conditions render it advisable.

It is not pretended that these notes cover the whole subject of train inspection, but it is believed that the points on which I have laid stress, while perfectly obvious, have not been brought out systematically by others writing on this subject.

Let us illustrate the above principles by some of the quarantine measures of this year.

McHenry, Miss.—Yellow fever: Seven cases were reported here the evening of June 9—the first cases, two of them, occurring May 19. A hasty inquiry showed that there had been such communication between this place and the territory along the Gulf and Ship Island Railroad south of Hattiesburg, and from Lumberton to Gulfport, that (1) there were a number of people in this territory who had been at McHenry within the past ten days, who were thus liable to develop yellow fever, and (2) as the fever had been in McHenry over three weeks there was reason to fear that foci of infection already existed in this territory.



Map for McHenry.

From the fever in McHenry being confined to private houses, none being in hotels or boarding houses, both of these risks were adjudged less than had the public houses been infected.

1. All places were quarantined against the town and a cordon thrown about it. There was thus no "communicating territory."

2. Obviously the district south of Hattiesburg, and from Lumberton to Gulfport, inclusive, was "neutral territory." It was accordingly quarantined against "pending investigation," and passenger traffic within this district recommended to be discontinued "pending investigation."

An inspector of territory, Dr. Perkins, of New Orleans, was taken to Gulfport on the morning of the 10th and stationed there. He was

directed to make a house-to-house inspection of that place as often as possible, move all who had been exposed to infection out of town, and see that this place be kept clean. Particular pains were taken with Gulfport because if infected it would be a danger to the line of the Louisville and Nashville Railroad, on which in its immediate vicinity were a number of considerable towns. Three other inspectors of territory, Drs. Stone, Tebo, and Römer, were placed on the line of the Gulf and Ship Island Railroad and directed to inspect this above-defined "neutral territory."

3. The line of the Louisville and Nashville, say, between Scranton and the Rigolets; the Gulf and Ship Island from Hattiesburg south; and the Queen and Crescent from Hattiesburg to Honey Island were recommended to be considered "drift territory," and no restriction of travel imposed thereon save that certificates of residence be required of those boarding trains in this section. This part of these three roads then was to be covered by train inspection.

This division I say was the one recommended. The State boards of Mississippi and Louisiana and the board of health of Mobile, however, decided to include the line of the Louisville and Nashville, from the Alabama line to the Louisiana line, in as neutral territory in which unknown foci of infection were suspected to exist and quarantined it pending investigation.

While the writer thinks, as he then thought and said, that this quarantine of the coast was not necessary, it was not unnatural that different people should differ in judgment about the limits of "neutral territory." He saw, however, and can see now, no sanitary reason for holding this quarantine on, as was done by some boards after inspection had shown that this territory was free from fever, and had sufficient quarantine against McHenry and suspected places.

Tents were placed just south of Hattiesburg under guard, to whom any suspects on the trains going north on either road were remanded until the train went south, when they were taken by the inspectors on these roads south to New Orleans or Gulfport, and sent by the inspector on the Louisville and Nashville to the camp at Fontainebleau, where they were taken in charge by the officer in command of the camp. A small number of people from McHenry, attempting to violate the quarantine, were thus handled. Those picked up on south-bound trains also went to Fontainebleau, without, of course, going into the guard tents.

The inspectors of territory soon reported that there were a number of people who had left McHenry within the past ten days at points between McHenry and Gulfport, and reported suspicious cases of fever at Perkinston, Bond, and at Breelands.

In the meantime some of the train crews of the Gulf and Ship Island Railroad which had been exposed to infection in working around McHenry were moved out of Gulfport. Relays were established at

Laudon and Maxie, and the investigation of the coast having satisfied the Mississippi board of health that there was no infection there, quarantine was raised (save by Louisiana) against all save the line of the Gulf and Ship Island between the relays.

Later on, this territory showing no yellow fever and the premises where suspicious sickness had occurred being disinfected, it was declared

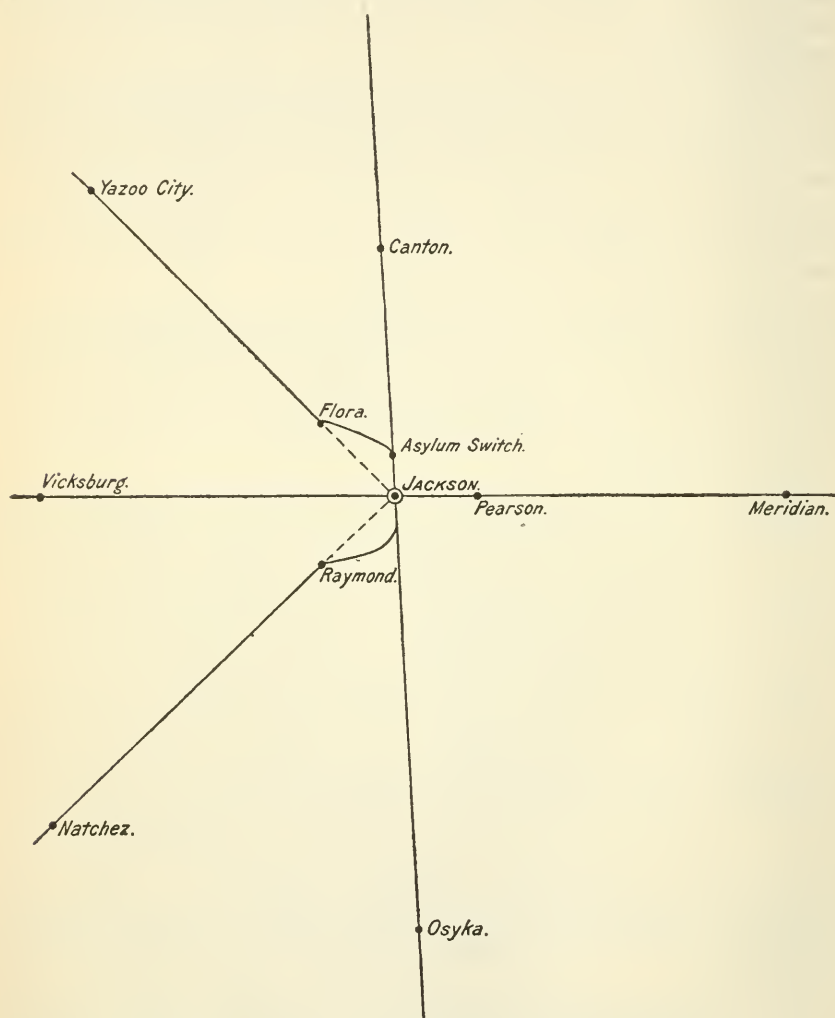


Diagram of railroads from Jackson.

clean and the relays moved close to McHenry, in which the work was done by a switch engine and special crew. There was then no neutral territory.

The work at Jackson illustrates the handling of both kinds of roads, those running to southern terminals and those going north. The fever

was announced here September 10. As soon as it was announced and prior to the laying of any quarantine a considerable number of people from Jackson left the town and went into the surrounding country by private conveyances.

The counties of Rankin and Hinds, and possibly some others, contained then people recently from Jackson, some of whom had possibly been exposed to infection, though there was no reason to believe that any focus of infection already existed outside of Jackson. Quarantine was then laid against the city. There was thus no communicating territory.

A glance at the map will show that the Illinois Central runs from Jackson north to noninfectible territory, into which these people could be allowed to go with no restrictions so far as residence is concerned.

The Illinois Central Railroad going south; the Alabama and Vicksburg passing through Jackson, from Vicksburg to Meridian; and the two branches of the Yazoo and Mississippi Valley, going, respectively, to Yazoo City and Natchez, led only to southern points and are then analogous to the line AS.

Inspection was established on all these roads—on the Illinois Central Railroad to extend from Osyka to Canton; on the Alabama and Vicksburg from Vicksburg to Meridian; on the other two lines from Flora to Yazoo City, and from Raymond to Natchez. Health certificates were required on these lines from all places between the terminals mentioned, and including Flora and Raymond. The distances traversed by the inspectors exceeded what could reasonably be considered “drift territory,” but was selected for convenience to get good stopping places; and on the Illinois Central for being a meeting point of trains, and no inconvenience was caused by requiring health certificates from the small amount of territory covered unnecessarily. Health certificates from Vicksburg, Meridian, Yazoo City, and Natchez were not required.

Relays.—The lines from Yazoo City to Natchez were not allowed to enter the quarantine limits at all. The Alabama and Vicksburg and the Illinois Central both did their business in the city with switch engines. The Illinois Central furnishing special cars for passengers, express, and mails, and the Alabama and Vicksburg for the mail and express; no passengers leaving by this route. In both cases the transfer was made out of town—the one at Asylum Switch, the other at Pearson. No relay camp was required for this work, as the crew of the switch engine remained on their own cars and stayed out of the quarantined district a very short time, about half an hour per trip. Both relays, however, were under guard. Reception camps were established just south of Canton, at Osyka, just west of Meridian, and at Vicksburg—at the eastern limit of the town, and at Natchez and Yazoo City.

The country covered by this inspection, especially that in which the refugees from Jackson had gone, required inspection; and an inspector of territory, Dr. Waldauer, of Vicksburg, was assigned to this work, although subsequent developments required his services elsewhere.

Such people of Jackson as wished to go north were allowed to go, at first, on separate coaches attached to the day through train of the Illinois Central Railroad; and later on, when New Orleans was known to be infected, they went into the same coaches with the New Orleans people, on a special refugee train. A guard was sent with them to north of Carbondale, in Illinois, on the main line, and north of Paducah, Ky., on the branch. These guards were not relayed, making the trip with the refugees to the above destination. The system of relay by switch engine in town is especially applicable to towns which are not terminal for railroads.

New Orleans.—The work at New Orleans might be described as illustrating with small variations all the principles set forth in this préces. We will only mention it with reference to the communicating territory.

The fever was declared here in the evening of September 17. The parishes south of the city and Jefferson and St. Charles elected to hold unrestricted communication with the city, as did St. Tammany (this, however, is believed to be uninfectible, or difficultly infectible, territory).

The country along the line of the Louisville and Nashville west of Gulfport elected to hold "daylight communication with disinfection of personal effects of immunes" with the city. The relays were established at Slidell, Dirt Pits, Laplace, Avondale, and Grand Gulf. No inspection was made for the communicating territory, save along the line of the Louisville and Nashville where the restrictions of "day-light communication" were in force.

On the Louisville and Nashville, the Queen and Crescent, and the Illinois Central Railroad, all going to northern points, through passenger traffic on special trains under relays of inspectors was allowed. On the other three roads local traffic began after passing the different communicating territory, and went on under inspection, no through traffic being allowed.

STATISTICS
OF THE
UNITED STATES MARINE-HOSPITAL SERVICE.

STATISTICS OF THE UNITED STATES MARINE-HOSPITAL SERVICE.

The following statistical tables are self-explanatory:

TABLE I.—COMPARATIVE TABLE OF NUMBER TREATED—1868 TO 1898.

The following tabular statement will serve to illustrate its growth since the reorganization of the Marine-Hospital Service in 1871:

Operations of the Marine-Hospital Service from July 1, 1868, to June 30, 1898.

Fiscal years.	Number of places at which relief was furnished.	Number of sick and disabled seamen furnished relief.
Prior to reorganization:		
1868.....	64	11,535
1869.....	64	11,356
1870.....	74	10,560
After reorganization:		
1871.....	72	14,256
1872.....	81	13,156
1873.....	91	13,529
1874.....	91	14,356
1875.....	94	15,009
1876.....	94	16,808
1877.....	100	15,175
1878.....	210	18,223
1879.....	210	20,922
1880.....	210	24,860
1881.....		32,613
1882.....		36,184
1883.....		40,195
1884.....		44,701
1885.....		41,714
1886.....		43,822
1887.....		45,314
1888.....		48,203
1889.....		49,518
1890.....		50,671
1891.....		52,992
1892.....		53,610
1893.....		53,317
1894.....		52,803
1895.....		52,643
1896.....		53,804
1897.....		54,477
1898.....		52,709

TABLE II.—EXHIBIT OF OPERATIONS OF THE SERVICE DURING THE YEAR ENDED JUNE 30, 1898.

Ports.	Total number of sea-men treated.	Patients in hospital July 1, 1897.	Admitted during the year.	Total treated in hospital.	Discharged.	Died.	Remaining in hospital June 30, 1898.	Number of days relief in hospital.	Number of persons furnished office relief.	Number of times relief was furnished.	Number of persons examined physically, including pilots.	Amount expended.	Tonnage tax collected.
Total.	52,709	768	11,146	11,914	10,822	381	711	313,472	40,795	62,628	4,620	\$600,131.45	\$846,771.06
Albany, N. Y.	1	1		1	1							100.00	116.19
Alexandria, Va.			30	30	30			398	83	110		758.00	2,459.52
Apalachicola, Fla.	113		18	19	18			337	56	58		271.34	
Ashland, Wis.	75	1	33	34	33		1	416	199	377		721.03	
Ashabula, Ohio.	233	1	32	33	31		2	517	88	181	37	848.38	
Astoria, Oreg.	121	1	46	47	44	31	31	19,752	1,730	2,518	382	19,868.87	14,001.08
Baltimore, Md.	2,206	30	29	31	28	1	2	479	75	103	7	497.88	68,501.73
Banzor, Me.	106	2							127	310		370.19	1,130.11
Barnstable, Mass., and subports	127								70	118		382.59	84.03
Bath, Me.	70		12	12	10	1	1	177	206	306	40	607.63	2,207.34
Beaufort, N. C.	218								58	78		104.30	100.59
Beaufort, S. C.	58												
Belfast, Me.			7	7	6			121	4	11		324.30	55,727.43
Bismarck, N. Dak.	11		722	771	698	21	55	25,836	2,129	2,971	474	26,648.93	133.57
Boston, Mass.	2,903	52			11			164	2	2		106.00	58.89
Brashear, La.													8.84
Bridgeton, Conn.	13												
Bridgeton, N. J.													
Bristol, R. I.													
Brownsville, Tex.	1												
Brunswick, Ga.	126	2	36	38	33	1	4	730	88	97	13	1,091.49	15,099.63
Buffalo, N. Y.	1,902	6	234	240	230	6	4	3,627	1,062	2,120	58	6,778.47	
Burlington, Iowa.	21		21	21	21			346				394.10	
Burlington, Vt.	2		2	2	2			59				39.00	244.62
Cairo, Ill.	921	5	284	289	263	12	14	4,551	632	757	2	11,218.95	
Cambridge, Md.	84		18	18	18			235	66	202		306.29	
Cape Vincent, N. Y.													486.93
Casine, Me.	5								5	11		11.00	285.39
Cedar Keys, Fla.	186		127	135	124	4	7	2,121	186	283		278.00	22.41
Charleston, S. C.	1,239	8							1,104	1,524	67	5,357.73	8,040.18
Chattanooga, Tenn.	31	1		1	1			17	30	110		321.01	
Chicago, Ill.	2,797	42	432	474	420	14	40	16,127	2,323	3,664	83	22,080.02	
Cincinnati, Ohio.	2,753	22	162	184	165	4	15	6,330	569	785	23	11,768.92	
Cleveland, Ohio.	1,874	34	410	444	398	8	38	13,367	1,430	2,036	117	16,382.28	135.06
Corpus Christi, Tex.	12		2	2	2			36	10	24	7	291.95	
Darien, Ga.	20								20	25		273.06	
Darien, Me.	112		23	23	21	1	1	833	89	97	37	3,315.17	
Delaware Breakwater, Delaware.	1,541	7	273	300	272	10	18	10,685	1,241	1,801	85	15,197.89	52.16
Detroit, Mich.													
Dubuque, Iowa.	37	4	16	20	19		1	235	17	26	11	513.22	

Duluth, Minn.	297	2	38	40	37	2	1	554	257	318	32	800.50
Eastport, Me.	12								12	18		113.35
Edenton, N. C.	100		6	6	6			51	154	236		406.50
Edgartown, Mass.	13		1	1	1			11	43	12		61.36
Elizabeth City, N. C.	43									54	134	250.00
Ellsworth, Me.	32		2	2	2			24	30	93	15	499.70
Eric, Pa.	89	3	17	20	19	1		347	69	87		806.12
Escanaba, Mich.	106	3	27	30	28	1	1	456	76	90		580.25
Eureka, Cal.	52	1	13	14	14			227	38	48	16	155.37
Evansville, Ind.	941	9	247	256	239	7	10	5,367	685	988	15	9,488.31
Fall River, Mass.												41.25
Fernandina, Fla.	38		8	8	8			173	30	60		533.00
Fredericksburg, Va.	93		6	6	6			61	87	176		204.90
Gallipolis, Ohio	220	3	100	103	98	1	4	1,810	117	345	26	2,102.83
Galveston, Tex.	562	6	177	183	173	4	6	3,365	379	478	110	7,259.68
Georgetown, S. C.	107		12	12	12			97	95	227	1	391.25
Gloucester, Mass.	386		4	4	2	1	1	104	382	539	6	767.73
Government Hospital for the Insane,												809.34
Washington, D. C.	31	25	6	31	2	3	26	9,403				6,074.79
Grand Haven, Mich.	43		5	5	5			132	38	79	75	502.80
Grand Falls, Mont.												190.34
Hartford, Conn.	10		10	10	8		2	170				170.00
Jacksonville, Fla.	219	3	95	98	93		5	1,704	121	216		2,065.15
Juneau, Alaska	69		29	29	27			415	40	127		1,454.75
Key West, Fla.	1,316	13	219	232	208	7	17	5,863	1,084	1,438	38	10,420.45
La Crosse, Wis.	175	4	38	42	42			459	133	357	3	1,010.97
Little Rock, Ark.	18		1	1	1			7	17	31		247.00
Los Angeles, Cal.												685.20
Louisville, Ky.	361	8	128	136	117	9	10	4,787	225	591	21	10,817.32
Ludington, Mich.	76		8	8	8			98	68	121		314.54
Machias, Me.	75		22	22	22			676	53	65	30	990.01
Manistee, Mich.	99		12	12	12			108	87	189	37	384.17
Marblehead, Mass.												30.36
Marquette, Mich.	76		15	15	14	1	1	474	61	70		861.36
Marshfield, Oreg.			6	6	6			72	75	126		479.49
Memphis, Tenn.	911	4	203	207	192	4	11	3,546	704	863	20	10,968.52
Milwaukee, Wis.	761	11	177	188	181	2	5	3,269	573	923	122	3,987.56
Mobile, Ala.	1,378	21	261	282	226	13	43	7,006	1,096	1,555	46	11,470.03
Nashville, Tenn.	113		9	9	9			140	104	257		12,162.93
Newark, N. J.												1,024.08
New Bedford, Mass.	72		2	2	2			26	70	145		414.57
Northern, N. C.	204	1	31	32	31	1		458	172	462		286.40
New Haven, Conn.	54	5	31	36	34	1	1	646	18	21	24	1,045.14
New London, Conn.	74	1	11	12	11	1		222	62	64		495.00
New Orleans, La.	2,645	27	514	541	492	20	29	11,965	2,004	2,682	109	777.95
Newport, Ark.	25		9	9	9			86	16	22		20,364.62
Newport, R. I.	95	2	33	35	33	2		507	60	67	124	387.81
Newport, Vt.												59.88
Newport News, Va.	101								101	103		245.10
New York, N. Y.	4,815	117	1,001	1,118	992	48	78	37,133	3,697	5,151	428	22,563.54
												283,827.57

Miscellaneous—\$100,112.65.

TABLE II.—EXHIBIT OF OPERATIONS OF THE SERVICE DURING THE YEAR ENDED JUNE 30, 1898—Continued.

Ports.	Total number of sea men treated.	Patients in hospital July 1, 1897.	Admitted during the year.	Total treated in hospital.	Discharged.	Died.	Remaining in hospital June 30, 1898.	Number of days relief in hospital.	Number of persons furnished office relief.	Number of times relief was furnished.	Number of persons examined physically, including pilots.	Amount expended.	Tonnage tax collected.
Norfolk, Va.	1,953	16	313	329	312	8	9	4,862	1,624	2,096	124	\$8,204.09	\$13,372.14
Ogdensburg, N. Y.	90	1	12	13	13			206	77	98		633.22	1,659.30
Omaha, Neb.												136.20	
Oswego, N. Y.	49	1	7	8	6	2		58	41	69		345.80	701.55
Pensacola, Fla.	160	2	123	125	121	1	3	2,117	25	120		2,869.32	21,470.61
Perth Amboy, N. Y.													298.23
Philadelphia, Pa.	1,496	27	345	372	343	11	18	7,923	1,124	1,555	314	16,151.05	69,815.40
Pittsburg, Pa.	1,542	7	195	202	195	4	3	2,980	1,340	1,936	26	5,372.31	
Plattsburg, N. Y.													3,203.37
Plymouth, Mass.	144	1	19	20	20								2.97
Port Huron, Mich.								351	124	228	72	616.10	10.80
Portland, Me.	728	13	149	162	148	3	11	5,720	566	673	66	12,296.77	13,342.01
Portland, Ore.	516	3	84	87	81	6		1,597	429	691	41	4,183.71	73.30
Portsmouth, N. H.	57	1	19	20	19	1		1,352	37	37			221.25
Port Tampa, Fla.	170	1	92	93	82		11	1,132	83	310		1,811.28	
Port Townsend, Wash.	396	19	187	206	170	8	28	9,245	190	291	23	12,314.04	18,967.26
Providence, R. I.	202	5	112	117	117			256	185	330		1,516.15	249.15
Richmond, Va.	67	1	17	18	16	1	1	231	49	49		542.03	135.69
Rochester, N. Y.													33.90
Rockland, Me.	142								142	416	28	539.20	
Rome, Ga.	22								22	30		148.75	
Sage Harbor, N. Y.	16								16	73		73.00	55.98
Sagamaw, Mich.	181	1	35	36	36			482	145	228	16	842.60	
Salem, Mass.	24		1	1	1			14	23	23		44.00	389.13
St. Augustine, Fla.													2.61
St. Louis, Mo.	1,282	31	403	434	387	16	31	10,199	848	1,398		15,040.55	
St. Marys, Ga.													168.45
St. Paul, Minn.	31		17	17	16	1		303	14	19	40	610.05	6.00
San Diego, Cal.	82	3	20	23	21	1	1	420	59	119	7	2,890.30	1,479.84
Sandusky, Ohio	94	1	31	32	28	1	3	500	62	99		704.09	
San Francisco, Cal.	3,006	73	678	751	654	43	54	27,361	2,255	4,667	550	29,954.88	38,330.94
San Pedro, Cal.	129		75	75	70		5	1,473	54	276		1,738.95	
Sault Ste. Marie, Mich.	132	1	48	49	43	1	5	516	83	103	5	1,069.80	
Savannah, Ga.	992	6	175	181	167	5	9	3,082	812	1,068	23	5,239.81	17,202.78
Seattle, Wash.	1,583	11	445	456	445	7	4	6,991	1,129	2,067	198	5,395.24	
Shedboro, Mass.													8,435.61
Shreveport, La.	186	1	40	41	41			742	145	947	1	1,602.93	
Sitka, Alaska.			3	3	3			90	1	1		271.00	4,381.37
Solomons, Md.	344		23	23	23			310	321	394		732.63	
Stonington, Conn.													30.45
Sturgeon Bay, Wis.	47	1	3	4	4			20	43	105	26	353.18	

Superior, Wis.	144	1	22	23	21	1	1	344	121	218	679.82	.....
Tacoma, Wash.	145	1	37	38	26	.....	.....	486	107	146	583.06	.....
Tappahannock, Va.	235	.....	89	89	89	.....	.....	682	146	236	1,306.75	.....
Toledo, Ohio.	274	2	126	128	122	1	5	2,096	146	438	1,993.10	.....
Tampa, Fla.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vicksburg, Miss.	56	4	51	55	52	.....	.....	.....	.....	.....	494.26	.....
Vineyard Haven, Mass.	315	11	91	102	92	1	9	4,940	213	241	8,163.33	.....
Waldoboro, Me.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington, D. C.	178	1	43	44	41	1	2	807	134	196	24,309.22	.....
Washington, D. C. (laboratory)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,951.33	.....
Wheeling, W. Va.	52	.....	24	24	24	.....	.....	377	28	50	583.95	.....
Wilmington, Del.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wilmington, N. C.	374	7	72	79	65	6	8	3,000	295	358	8,622.74	.....
Wisconsin, Mo.	2	.....	.....	.....	.....	.....	.....	.....	2	.....	3.24	.....
Cape Charles Quarantine	4	.....	3	3	2	1	.....	13	1	.....	(1)	.....
Gulf Quarantine	111	1	63	64	61	1	2	545	47	66	.....	.....
Cape Fear Quarantine	5	.....	.....	.....	.....	.....	.....	.....	5	9	.....	.....
Port Townsend Quarantine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reedy Island Quarantine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Diego Quarantine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco Quarantine	12	1	11	12	12	.....	.....	192	.....	.....	.....	.....
South Atlantic Quarantine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tortugas Quarantine	59	4	29	33	32	1	.....	299	26	28	.....	.....

¹ Expenditures for quarantine station appear elsewhere in financial statement

TABLE III.—SUMMARY OF PHYSICAL EXAMINATIONS OF SEAMEN MADE BY OFFICERS OF THE UNITED STATES MARINE-HOSPITAL SERVICE, YEAR ENDED JUNE 30, 1898.

Summary of examinations and causes of rejection.	Total.	Pilots.	Revenue Cutter Service.	Life-Saving Service.	Coast Survey Service.	Marine-Hospital Service.	Light-House Service.	Naval Reserve.
Summary of examinations:								
Total number examined	4,620	1,064	1,103	2,143	39	22	16	233
Number passed	4,225	1,010	921	2,017	33	19	13	212
Number rejected	395	54	182	126	6	3	3	21
Causes of rejection:								
Chorea	1			1				
Color-blindness	86	45	17	22			2	
Consolidation of right lung	5		1	1	1			2
Curvature of spine	1			1				
Deafness	3		1	1				1
Debility	3		1	1				1
Defective vision	20		6	12			1	1
Disease of heart:								
Fatty degeneration	3	1	2					
Hypertrophy	5		2	1				2
Mitral insufficiency	8	1	3	2	1	1		
Mitral murmur	6		1	1	1			3
Mitral regurgitation	7		1	3	1	1		1
Valvular	4		2	2				
Enlarged tonsils	20	1	7	5	1			6
Epididymitis	12	2	6	3	1			
Gallstones	1		1					
Gonorrhea	17	2	8	6				1
Hemorrhoids:								
External	15		11	4				
Internal	7		4	3				
Hernia:								
Inguinal	5		2	3				
Oblique	9		5	4				
Hydrocele	12	2	4	6				
Insufficient stature	5		2	2				1
Insufficient chest expansion	8		5	3				
Myopia	16		9	7				
Neurasthenia	3		1	2				
Nephritis	5		3	1		1		
Orchitis	10		3	7				
Roughened breathing	4		2	1				1
Rheumatism	11		7	4				
Rupture	2		2					
Scar on leg	1		1					
Sarcoma of testicles	2			2				
Simple continued fever	1			1				
Sprain of ankle	1		1					
Syphilis:								
Primary	4		3	1				
Secondary	8		3	5				
Tubercle of lungs	15		12	3				
Tumor of arm	1			1				
Varicose veins of leg	20		16	4				
Varicocele	21		20					1
Weak lungs	2		2					
Weak pulse	3		3					
Unfit for northern latitudes	2		2					

TABLE IV.—STATEMENT, BY DISTRICTS, OF THE NUMBER OF PATIENTS TREATED DURING THE YEAR ENDED JUNE 30, 1898.

Districts.	Total cases.	Patients in hospital July 1, 1897.	Admitted during the year.	Total number treated in hospital.	Discharged.	Died.	Patients in hospital June 30, 1898.	Number of days hospital relief furnished.	Number of seamen furnished office relief.
Grand total	52,709	768	11,146	11,914	10,822	381	711	313,472	40,795
North Atlantic	5,368	86	1,089	1,175	1,067	30	78	39,004	4,193
Middle Atlantic	6,591	151	1,432	1,583	1,421	62	100	47,095	5,008
South Atlantic	9,091	100	1,535	1,635	1,470	62	103	48,019	7,456
The Gulf	6,657	71	1,458	1,529	1,375	45	109	32,644	5,128
The Ohio	4,013	50	865	915	848	25	42	21,808	3,098
The Mississippi	3,488	52	1,050	1,102	1,008	35	59	20,479	2,386
The Great Lakes	11,124	140	2,062	2,142	1,968	50	124	54,520	8,982
The Pacific	6,186	112	1,609	1,721	1,558	69	94	48,894	4,465
The quarantine stations	191	6	106	112	107	3	2	1,009	79

TABLE V.—RATIO OF PATIENTS TREATED IN HOSPITAL IN EACH DISTRICT.

Districts.	Per cent of total number of patients.	Districts.	Per cent of total number of patients.
North Atlantic	21.89	The Mississippi	31.59
Middle Atlantic	24.02	The Great Lakes	19.26
South Atlantic	17.98	The Pacific	27.82
The Gulf	22.97	The quarantine stations	58.64
The Ohio	23.80		

TABLE VI.—AVERAGE DURATION OF TREATMENT IN HOSPITAL IN EACH DISTRICT.

Districts.	Average number of days' relief furnished to each patient.	Districts.	Average number of days' relief furnished to each patient.
North Atlantic	33.11	The Mississippi	18.57
Middle Atlantic	29.75	The Great Lakes	25.45
South Atlantic	29.37	The Pacific	23.41
The Gulf	21.35	The quarantine stations	9.00
The Ohio	23.83		

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898.

Diseases.	Number of cases.									
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.				Remaining under treatment at close of year.	Number furnished office re- lief.	Number treated in hospital and dispensary.	
			Recovered.	Improved.	Not improved.	Died.				
Total of all cases	768	11,146	6,625	3,898	299	381	711	40,795	52,709	
GENERAL DISEASES	295	4,906	2,783	1,822	106	173	317	17,901	23,102	
LOCAL DISEASES	345	4,306	2,456	1,555	170	175	295	19,016	23,667	
GENERAL INJURIES	14	178	127	33	2	15	15	203	395	
LOCAL INJURIES	114	1,756	1,259	488	21	18	84	3,675	5,545	

NORTH ATLANTIC.

TOTAL CASES	86	1,089	703	326	38	30	78	4,193	5,368	
General Diseases	35	413	250	143	9	13	33	1,608	2,056	
Cowpox								1	1	
Measles		4	4						4	
Influenza		8	8					62	70	
Mumps		1	1					1	2	
Diphtheria		2	2						2	
Simple continued fever		2	2						5	
Enteric fever	1	22	18	1	1	3		6	29	
Choleraic diarrhœa								2	2	
Dysentery		1	1					6	4	
Beri-beri		1	1					1	2	
Malarial fever:										
Intermittent	4	66	64	4	1		1	123	193	
Remittent	2	14	14				2	3	19	
Erysipelas		2	1	1				2	4	
Pyæmia		1		1					1	

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.				Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.	Died.			
General Diseases—Continued.									
Tubercle	3	39		22	2	7	11	38	80
Syphilis:									
Primary		3	2	1				28	31
Secondary	6	53		51		1	7	238	297
Gonorrhœa	2	67	40	26			3	519	588
Diseases dependent on animal parasitæ:									
Tænia solium		1	1					3	4
Tænia mediocanellata		1	1					1	2
Ascaris lumbricoides								1	1
Oxyuris vermicularis								2	2
Phthirus inguinalis								6	6
Sarcoptes scabiei								5	5
Diseases dependent on vegetable parasitæ:									
Trichophyton tonsurans								5	5
Microsporon furfur								1	1
Effects of animal poisons								4	4
Effects of vegetable poisons—Rhus toxicodendron								3	3
Effects of inorganic poisons—Lead colic	1	1	1	1				2	2
Effects of the presence of foreign bodies								4	4
Effects of cold		1		1			1	1	1
Alcoholism		8	8					18	26
Rheumatic fever	2	18	16	1		1	2	3	23
Rheumatism	12	78	58	27	1		4	422	512
Gout								1	1
Osteoarthritis	1	1	1	1	1			2	2
Cyst		2	2					2	4
New growth, nonmalignant:									
Lipoma		4	3		1			1	5
Fibroma								3	3
Papilloma		1		1				4	5
Pterygium		1	1						1
New growth, malignant:									
Carcinoma		4	1	1	1		1	4	8
Squamous Carcinoma		1					1	1	2
Anæmia								3	3
Diabetes mellitus								2	2
Diabetes insipidus	1	2		2	1				3
Congenital malformations—Hypospadiæ fissure of urethra								1	1
Debility		3		2		1		75	78
Local Diseases	35	490	304	147	27	14	33	2,129	2,654
DISEASES OF THE NERVOUS SYSTEM	8	28	10	9	5	2	10	113	149
Of the nerves:									
Inflammation—Neuritis		1		1				1	2
Of the spinal cord and membranes—cord:									
Inflammation—Diffuse								3	3
Degeneration—									
Of lateral columns	1	2				1	2		3
Of posterior columns		4		2	1		1	3	7
Of the brain and its membranes—membranes:									
Hæmorrhage		1					1		1
Functional nervous disorders, with other diseases of undetermined nature:									
Apoplexy	1			1					1
Paralysis—									
Paraplegia		2			1		1	1	3
Hemiplegia	3	3		3		1	2		6
Local paralysis		1	1					3	4
Incomplete paralysis		1					1	6	7

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.									
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.				Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.	
			Recovered.	Improved.	Not improved.	Died.				
Local Diseases—Continued.										
DISEASES OF THE NERVOUS SYSTEM—Continued.										
Epilepsy								3		3
Vertigo								12		12
Headache		1			1			15		16
Anæsthesia								1		1
Neuralgia	1	9	9	1				35		45
Hysteria								1		1
Nervous weakness		1		1				27		28
Mania	2	1			1		2			3
Dementia								1		1
Delusional insanity		1			1			1		2
DISEASES OF THE EYE	3	11	7	5	1		1	49		63
Conjunctivitis	1	5	3	3				32		38
Keratitis								3		3
Iritis		3	2	1				3		6
Hæmorrhage of the choroid								1		1
Optic neuritis		1		1						1
Atrophy and degeneration of optic nerve or papilla								1		1
Retinitis	1						1			1
Lenticular cataract	1				1			4		5
Calcification of vitreous		1	1					1		2
Ametropia								1		1
Disorders of accommodation—Presbyopia								1		1
Blepharitis		1	1					2		3
DISEASES OF THE EAR		5	2	2	1			27		32
Inflammation of the external meatus—										
Acute								3		3
Chronic								1		1
Abscess		1	1							1
Hyperostosis								1		1
Accumulation of wax or epidermis								4		4
Inflammation of the middle ear—										
Nonsuppurative								8		8
Suppurative		2	1	1				9		11
Perforation of membrana tympani		1		1						1
Deafness		1			1			1		2
DISEASES OF THE NOSE		1		1				33		34
Inflammation of soft parts		1		1				26		27
Diseases of septum—Perforation								1		1
Epistaxis								1		1
Inflammation of the naso-pharynx								5		5
DISEASES OF THE CIRCULATORY SYSTEM ..	2	33	5	17	5	3	5	48		83
Pericarditis		1	1							1
Valvular disease—										
Aortic	1	7		4	2	1	1	5		13
Mitral	1	14		7	2	2	4	21		36
Hypertrophy of heart								2		2
Dilatation of heart		1		1				4		5
Angina pectoris								1		1
Disordered action of the heart—										
Abnormal rapidity								1		1
Aneurysm of arteries		1		1				1		2
Obstruction of veins								13		13
Varix		8	3	4	1					8
Nævus		1	1							1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.				Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.	Died.			
Local Diseases—Continued.									
DISEASES OF THE RESPIRATORY SYSTEM	6	71	45	23	3	2	4	364	441
Inflammation of mucous membrane of larynx—									
Catarrhal, acute		1	1					7	8
Catarrhal, chronic								2	2
Bronchitis—									
Catarrhal, acute	2	32	23	8	1	1	1	256	290
Catarrhal, chronic	1	10	2	6	2		1	52	63
Spasmodic asthma		2	1	1				12	14
Hæmorrhage of lung		1	1					1	2
Hæmoptysis								1	1
Pneumonia	1	13	10	4					14
Broncho-pneumonia		1				1			1
Abscess of lung									
Chronic interstitial inflammation		1		1				1	2
Phthisis—									
Acute								2	2
Chronic		1		1				6	7
Tubercular		1					1		1
Pleurisy—									
Acute	2	8	7	2			1	12	22
Chronic								12	12
DISEASES OF THE DIGESTIVE SYSTEM	2	122	82	27	6	2	7	669	793
Ulceration of the lips		1		1				3	4
Inflammation of the mouth								3	3
Ulceration of the mouth								11	11
Caries of dentine and cementum								11	11
Abscess of dental periosteum		1	1					4	5
Inflammation of gums and alveoli								1	1
Suppuration of the alveoli								2	2
Ulceration of gums and alveoli		1		1					1
Caries of the alveoli								1	1
Toothache		1	1					1	2
Sore throat		5	4	1				16	21
Ulceration of the fauces		1	1					1	2
Inflammation of tonsils—									
Follicular		9	8	1				31	40
Suppuration		4	3		1			5	9
Hypertrophy of tonsils								3	3
Elongated uvula								29	29
Inflammation of salivary glands								1	1
Inflammation of the pharynx—									
Catarrhal		1					1	26	27
Follicular		2		2				1	3
Inflammation of the stomach—catarrhal		12	6	4	1		1	58	70
Ulceration of the stomach—									
Superficial		1				1		1	2
Perforating		1		1				1	2
Indigestion		3	3					137	140
Pyrosis								1	1
Vomiting								1	1
Gastralgia								1	1
Loss of appetite								1	1
Inflammation of the intestines—									
Enteritis		2	2					1	3
Typhlitis		6	5	1				2	8
Colitis	1	1	1	1				6	8
Catarrhal	1	5	6					4	10
Fistula of the intestines		1	1						1
Sprue								1	1
Hernia		9	2	5	1		1	74	8
Intestinal dyspepsia		1			1			1	5

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE GENERATIVE SYSTEM—Continued.									
Soft chancre.....		35	25	10				115	150
Inflammation of the scrotum.....		1	1						1
Varicocele.....		2		1	1			3	5
Hydrocele of tunica vaginalis.....	1	5	6					17	23
Inflammation of the testicle—									
Acute orchitis.....		9	8	1				16	25
Chronic orchitis.....		1	1					8	9
Epididymitis.....		2	2					14	16
Spermatorrhœa.....								10	10
DISEASES OF THE ORGANS OF LOCOMOTION.									
Inflammation of the bones—periostitis.....	3	21	15	7	1		1	76	100
Chronic abscess of bone.....	1		1					3	4
Caries.....	1	3	1	2	1			1	5
Necrosis.....	1	3	3	1				1	5
Inflammation of joints, synovitis, acute.....		2	1	1				7	9
Inflammation of joints, synovitis, chronic.....		1		1				6	7
Ankylosis.....		1	1					1	2
Dislocation of articular cartilage.....		2	2						2
Psoas, lumbar, and other abscesses.....		1		1					1
Inflammation of spine.....		1		1					1
Caries of the spine.....		1					1		1
Inflammation of muscles.....								1	1
Atrophy of muscles.....								1	1
Myalgia.....		4	4					37	41
Inflammation of sheaths of tendons.....								3	3
Ganglion.....								2	2
Inflammation of bursæ.....		1	1					9	10
Abscess of bursæ.....		1	1					2	3
Bunion.....								1	1
DISEASES OF THE CONNECTIVE TISSUE.....									
Inflammation.....		24	21	2			1	88	112
Abscess.....		5	5					36	41
Edema.....		19	16	2			1	50	69
								2	2
DISEASES OF THE SKIN.....									
Erythema.....	2	39	30	11				242	283
Roseola.....	1		1					2	3
Pityriasis rosea.....								1	1
Urticaria.....		1	1					1	1
Eczema.....								7	7
Impetigo.....		2	2					44	46
Pityriasis rubra.....								1	1
Prurigo.....								1	1
Psoriasis.....								2	2
Herpes.....								5	5
Zona.....								3	3
Pemphigus.....								1	1
Dermatitis herpetiformis.....								1	1
Acne.....		1		1				6	7
Sycosis.....								1	1
Seborrhœa.....								4	4
Ulcer.....	1	21	15	7				77	99
Boil.....		4	2	2				43	47
Carbuncle.....		2	1	1				2	4
Whitlow.....		5	5					23	28
Onychia.....								7	7
Tylosis.....								1	1
Corn.....		2	2					2	4

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

NORTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE SKIN—Continued.									
Wen		1	1					4	5
Lupus								3	3
Injuries	16	186	149	36	2	3	12	456	658
GENERAL INJURIES	2	13	12	2			1	14	23
Effects of heat—burns and scalds	2	10	10	1			1	11	29
Multiple injury		3	2	1				3	6
LOCAL INJURIES	14	173	137	34	2	3	11	442	629
Rupture of the arteries		1				1			1
Rupture of veins		1	1						1
Contusion of muscles								1	1
Strain of muscles		2	1	1				20	22
Rupture of muscles		1		1					1
Strain of tendons								1	1
Abrasion of skin								1	1
Frostbite		6	6					11	17
Contusion of scalp								1	1
Wound of the scalp		2	2					10	12
With injury to the aponeurosis		2	1				1	8	10
Fracture of the base of the skull		1				1			1
Concussion of brain		2	2					1	3
Contusion of face		4	3	1				2	6
Wound of face and mouth		3	3					10	13
Fracture of facial bones	1	2	2	1				1	4
Contusion of the eyelid								1	1
Wound of eyelid								1	1
Foreign bodies in the conjunctiva or cornea								1	1
Rupture of membrana tympani								1	1
Contusion of neck								1	1
Contusion of the chest		12	7	5				37	49
Dislocation of costal cartilages		1	1						1
Fracture of the ribs		7	5	2				9	16
Wound of parietes of chest		1	1						1
Contusion of back	1	6	5	2				19	26
Sprain of back	1	8	7	2				16	25
Contusion of abdomen		2	2					2	4
Wound of parietes of abdomen		1	1						1
Contusion of the upper extremities		9	6	2			1	45	54
Sprain of the shoulder								6	6
Sprain of the elbow		1					1	1	2
Sprain of the wrist								15	15
Sprain of the thumb								4	4
Sprain of the fingers								4	4
Wound of the upper extremities	3	24	21	4	1		1	93	120
Fracture of the humerus	1	3	2	2				1	5
Fracture of the bones of the forearm—									
Radius		3	3					7	10
Ulna		1	1					1	2
Both bones		2	1	1				2	4
Fracture of carpus, metacarpus, or phalanges		5	4	1				10	15
Dislocation of the clavicle		8	5		1		2	6	14
Dislocation of the humerus		1	1						1
Dislocation of the radius and ulna		1		1					1
Dislocation of the phalanges of fingers								1	1
Contusion of the lower extremities	3	13	13	2			1	39	55
Sprain of the knee								11	11
Sprain of the ankle		10	7	2			1	16	26
Sprain of the foot		1	1					3	4

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES
TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

MIDDLE ATLANTIC—Continued.

[illegible]

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

MIDDLE ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Inflammation of the pharynx—									
Catarrhal		1	1					23	24
Granular		1	1					7	8
Follicular		2	2					1	3
Inflammation of the stomach	1	10	6	4			1	66	77
Ulceration of the stomach, superficial		1		1					1
Indigestion		6	6					72	78
Gastralgia		1	1					1	2
Inflammation of the intestines—									
Enteritis								4	4
Typhlitis	2	2	3			1		1	5
Colitis								4	4
Catarrhal								9	9
Hæmorrhage of the intestines								1	1
Hernia	1	14	8	3	3	1		152	167
Obstruction of the intestines		1	1					83	84
Constipation		1	1					8	9
Diarrhœa		11	9	1			1	70	81
Inflammation of the rectum		1	1					1	2
Periproctitis—abscess		5	2	1	1		1		5
Fissure of the anus		1	1						1
Fistula in ano	3	4	5	1			1	6	13
Prolapse of the rectum	1	1	1				1		2
Piles:									
Internal	1	6	4	1	1		1	15	22
External		5	2	3				9	14
Mixed								6	6
Inflammation of the liver—									
Acute								1	1
Acute, suppurative		1		1					1
Acute, abscess								1	1
Chronic		2				1	1		2
Hyperæmia of the liver		1	1						1
Hypertrophy of the liver		1	1						1
Jaundice								4	4
Inflammation of hepatic ducts and gall bladder		4	3			1		2	6
Calculi	1	1	1	1				3	5
DISEASES OF THE LYMPHATIC SYSTEM									
Inflammation of lymph glands	1	58	40	11	3		5	62	121
Suppuration		33	19	9	1		4	53	86
Hypertrophy of lymph glands	1	25	21	2	2		1	8	34
								1	1
DISEASES OF THE URINARY SYSTEM									
Acute nephritis	4	30	6	20	1	4	3	40	74
Bright's disease	2	2	1	3				1	5
Calculi in ureter	2	19		14		4	3	9	30
Nephralgia								1	1
Hæmaturia								2	2
Albuminuria								1	1
Oxaluria		1		1				1	1
Phosphaturia								1	1
Inflammation of bladder—									
Acute		3	2	1				9	12
Subacute		1		1				5	6
Chronic								5	5
Irritability of bladder		1	1					1	2
Retention of urine		2	2						2
Incontinence of urine		1			1			4	5

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

MIDDLE ATLANTIC—Continued.

Diseases.	Number of cases.								Number treated in hospital and dispensary.	
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.		
			Recovered.	Improved.	Not improved.					
Local Diseases—Continued.										
DISEASES OF THE SKIN—Continued.										
Sudamina.....									1	1
Zona.....		1	1						4	5
Dermatitis herpetiformis.....									1	1
Acne.....									1	1
Sycosis.....									2	2
Ulcer.....	2	44	28	13	1		4	122		168
Boil.....	1	9	7	3				37		47
Carbuncle.....		3	3					6		9
Whitlow.....		1	1					3		4
Wen.....								1		1
Pruritus.....								1		1
Injuries.....	18	179	142	39	3	1	12	403		600
GENERAL INJURIES.....	4	17	17	3			1	23		44
Effects of heat—										
Burns and scalds.....	4	15	15	3			1	22		41
Heatstroke.....		2	2							2
Effects of chemical irritants and corrosives.....									1	1
LOCAL INJURIES.....	14	162	125	36	3	1	11	380		556
Contusion of muscles.....		1			1			2		3
Strain of muscles.....		2	1	1				20		22
Wound of tendons.....								3		3
Frostbite.....		7	7					6		13
Wound of the scalp.....								3		3
With injury to the aponeurosis.....		3	2				1	7		10
Contusion of face.....		1	1					3		4
Wound of face and mouth.....		6	3	2			1	11		17
Fracture of facial bones.....		2		1			1	2		4
Contusion of the eyelid.....								3		3
Wound of conjunctiva.....		2	2					2		4
Foreign bodies in the conjunctiva or cornea.....									10	10
Contusion of pinna.....								1		1
Wound of pinna.....								2		2
Rupture of membrana tympani.....		1			1					1
Contusion of neck.....		1	1							1
Foreign body in the food passages.....								1		1
Contusion of the chest.....		18	15	3				27		45
Fracture of the ribs.....	1	7	2	4		1	1	7		15
Wound of parietes of chest.....								1		1
Contusion of back.....		5	5					7		12
Sprain of back.....								5		5
Wound of back.....								1		1
Contusion of abdomen.....								1		1
Contusion of the pelvis.....		1	1							1
Laceration of urethra.....		1	1							1
Contusion of testicle.....		1		1						1
Contusion of the upper extremities.....	1	9	8	1			1	53		63
Sprain of the shoulder.....		3	1	2				3		6
Sprain of the elbow.....		2	1	1						2
Sprain of the wrist.....	1	1		2				3		5
Sprain of the thumb.....		1					1			1
Sprain of the fingers.....								3		3
Wound of the upper extremities.....	1	21	15	4	1		2	106		128
Fracture of the clavicle.....		4	2	2						4
Fracture of the humerus.....		1	1					1		2
Fracture of the bones of the forearm—										
Radius.....		3	3					3		6
Ulna.....	1		1							1
Both bones.....	1	1	1	1						2

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

MIDDLE ATLANTIC—Continued.

Diseases.	Number of cases.									
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.				Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.	
			Recovered.	Improved.	Not improved.	Died.				
Local Diseases—Continued.										
LOCAL INJURIES—Continued.										
Fracture of carpus, metacarpus, or phalanges	1	3	4					9	13	
Dislocation of the clavicle		1		1				1	2	
Dislocation of the humerus		2	2					1	3	
Contusion of the lower extremities ..	3	19	16	5			1	31	53	
Sprain of the knee	1		1					3	4	
Sprain of the ankle	1	14	12	3				17	32	
Sprain of the foot								1	1	
Wound of the lower extremities		8	8					18	26	
Fracture of femur	1	3	2	1			1	1	5	
Fracture of tibia		3	2				1		3	
Fracture of fibula		1	1						1	
Fracture of tibia and fibula	1	3	4					1	5	

SOUTH ATLANTIC.

TOTAL CASES	100	1,535	822	608	40	62	103	7,456	9,091
General Diseases	28	720	386	289	11	29	33	3,319	4,067
Smallpox								1	1
Cowpox								40	40
Chicken pox								1	1
Measles		8	6	2					8
Rubella		1	1						1
Influenza		23	11	11		1		128	151
Whooping-cough								1	1
Mumps		2	1	1				3	5
Simple continued fever		4	4						4
Enteric fever	2	22	15	1		2	6	1	25
Epidemic diarrhea								2	2
Dysentery	1	28	22	6			1	45	74
Beriberi	1			1					1
Malarial fever:									
Intermittent	5	202	176	25	3	1	2	980	1,187
Remittent	2	85	57	22	1	3	4	67	154
Erysipelas		8	5	2			1	8	16
Septicæmia		1		1					1
Tubercle	7	59		31	5	21	9	97	163
Syphilis:									
Primary		7	3	4				68	75
Secondary	4	91		92	1		2	407	502
Gonorrhea		30	7	23				725	755
Diseases dependent on animal parasites:									
Tænia solium		1		1				2	3
Phthirius inguinalis								5	5
Sarcoptes scabiei								11	11
Diseases dependent on vegetable parasites:									
Achorion Schönleini								1	1
Trichophyton tonsurans								8	8
Effects of animal poisons		7	6	1				6	13
Effects of vegetable poisons		1	1					1	2
Tobacco		1		1					1
Effects of the presence of foreign bodies		1	1					5	6
Effects of chemical agents—Iodine								1	1
Effects of excessive exertion and strain		2	2						2
Scurvy								1	1
Alcoholism	2	5	6	1				8	15
Rheumatic fever		24	9	13			2	8	32

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.									
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.				Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.	
			Recovered.	Improved.	Not improved.	Died.				
General Diseases—Continued.										
Rheumatism	1	94	47	43	.....	.....	5	587	682
Gout .....	.....	.....	.....	.....	.....	.....	.....	1	1
Osteoarthritis .....	.....	2	.....	2	.....	.....	.....	7	9
Cyst .....	.....	.....	.....	.....	.....	.....	.....	2	2
New growth, nonmalignant:	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chondroma	1	.....	1	.....	.....	.....	.....	1	2
Papilloma .....	.....	.....	.....	.....	.....	.....	.....	4	4
Condyloma .....	.....	.....	.....	.....	.....	.....	.....	2	2
Pterygium .....	.....	.....	.....	.....	.....	.....	.....	2	2
New growth, malignant:	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sarcoma .....	.....	1	.....	1	.....	.....	.....	.....	1
Carcinoma .....	.....	3	.....	1	1	1	.....	3	6
Squamous carcinoma .....	.....	1	1	.....	.....	.....	.....	1	2
Anæmia .....	.....	.....	.....	.....	.....	.....	.....	1	1
Diabetes mellitus .....	.....	2	.....	2	.....	.....	.....	6	8
Debility	2	4	4	1	.....	.....	1	71	77
Local Diseases	61	560	266	243	24	27	61	3,601	4,222	
DISEASES OF THE NERVOUS SYSTEM	35	30	9	14	2	8	32	204	269	
Of the nerves:	.....	.....	.....	.....	.....	.....	.....	.....	.....
Inflammation—Neuritis .....	.....	1	.....	.....	.....	.....	1	7	8
Of the spinal cord and membranes—	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cord:	.....	.....	.....	.....	.....	.....	.....	.....	.....
Inflammation—Diffuse	1	.....	.....	.....	.....	1	.....	1	2
Degeneration—	.....	.....	.....	.....	.....	.....	.....	.....	.....
Of lateral columns .....	.....	1	.....	1	.....	.....	.....	.....	1
Of posterior columns .....	.....	1	.....	1	.....	.....	.....	.....	1
Of the brain and its membranes—Brain:	.....	.....	.....	.....	.....	.....	.....	.....	.....
Inflammation .....	.....	1	.....	.....	.....	1	.....	.....	.....
Hyperæmia .....	.....	2	1	1	.....	.....	.....	.....	2
Functional nervous disorders with	.....	.....	.....	.....	.....	.....	.....	.....	.....
other diseases of undetermined	.....	.....	.....	.....	.....	.....	.....	.....	.....
nature:	.....	.....	.....	.....	.....	.....	.....	.....	.....
Paralysis—	.....	.....	.....	.....	.....	.....	.....	.....	.....
Paraplegia	2	.....	.....	.....	.....	.....	2	.....	2
Hemiplegia	5	2	.....	3	.....	1	3	19	26
Local paralysis .....	.....	3	.....	2	1	.....	.....	1	4
Incomplete paralysis .....	.....	.....	.....	.....	.....	.....	.....	1	1
Spasm .....	.....	.....	.....	.....	.....	.....	.....	4	4
Torticollis .....	.....	.....	.....	.....	.....	.....	.....	1	1
Epilepsy	1	2	.....	3	.....	.....	.....	5	8
Vertigo	1	.....	.....	.....	.....	1	.....	5	6
Headache .....	.....	.....	.....	.....	.....	.....	.....	8	8
Anæsthesia .....	.....	1	.....	1	.....	.....	.....	2	3
Neuralgia .....	.....	9	7	2	.....	.....	.....	142	151
Hiccough .....	.....	.....	.....	.....	.....	.....	.....	2	2
Nervous weakness .....	.....	.....	.....	.....	.....	.....	.....	5	5
Mania—	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute	1	4	.....	.....	1	1	3	1	6
Chronic	9	.....	.....	.....	.....	1	8	.....	9
Melancholia—	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute	1	1	.....	.....	.....	.....	2	.....	2
Chronic	9	.....	.....	.....	.....	.....	9	.....	9
Dementia	3	2	1	.....	.....	2	2	.....	5
Epileptic	1	.....	.....	.....	.....	.....	1	.....	1
General paralysis of the insane	1	.....	.....	.....	.....	.....	1	.....	1
DISEASES OF THE EYE	2	16	3	10	3	.....	2	72	90
Conjunctivitis .....	.....	.....	.....	.....	.....	.....	.....	50	50
Ecthymosis of conjunctiva .....	.....	.....	.....	.....	.....	.....	.....	2	2
Keratitis .....	.....	3	.....	2	.....	.....	1	3	6
Ulceration of cornea .....	.....	1	1	.....	.....	.....	.....	1	2
Iritis .....	.....	6	1	5	.....	.....	.....	3	9

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.									
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.				Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.	
			Recovered.	Improved.	Not improved.	Died.				
Local Diseases—Continued.										
DISEASES OF THE EYE—Continued.										
Glaucoma.....	1	2	.....	1	2	.....	.....	2	.....	.....
Retinitis.....
Lenticular cataract.....	1	2	.....	1	1	.....	1	.....	3	.....
Amblyopia—Day blindness.....	5	.....
Sty.....	1	.....
Abscess of eyelid.....	2	.....
Edema of eyelid.....	2	1	1	.....	.....	.....	.....	.....	.....
DISEASES OF THE EAR.....										
Inflammation of the external meatus—	3	1	1	.....	.....	1	40	.....	40
Acute.....	3	.....	.....
Chronic.....	2	.....	.....
Abscess.....	1	1	.....	.....	.....	.....	1	.....	.....
Accumulation of wax or epidermis.....	9	.....	.....
Inflammation of the middle ear—
Nonsuppurative.....	12	.....	12
Suppurative.....	2	.....	1	.....	.....	1	10	.....	10
Perforation of membrana tympani.....	1	.....	.....
Obstruction of Eustachian tube.....	1	.....	.....
Tinnitus.....	1	.....	.....
DISEASES OF THE NOSE.....										
Inflammation of soft parts.....	1	.....	1	.....	.....	.....	37	.....	37
Epistaxis.....	1	.....	1	.....	.....	.....	29	.....	29
Inflammation of the naso-pharynx.....	2	.....	2
.....	6	.....	6
DISEASES OF THE CIRCULATORY SYSTEM.....										
Pericarditis.....	2	27	2	18	2	3	4	61	.....	90
Valvular disease—	1	.....	1	.....	.....	.....	3	.....	4
Aortic.....	1	13	.....	8	1	2	3	8	.....	23
Mitral.....	1	9	.....	7	1	1	1	10	.....	20
Degeneration of heart—fatty.....	1	.....	.....
Atrophy of heart.....	1	.....	.....
Hypertrophy of heart.....	5	.....	.....
Angina pectoris.....	1	.....	.....
Disordered action of the heart—
Abnormal rapidity.....	1	1	.....	.....	.....	.....	11	.....	12
Irregularity.....	5	.....	5
Arteritis—Endarteritis.....	1	.....	.....
Aneurysm of arteries.....	2	.....	.....
Obstruction of arteries—Embolism.....	1	.....	1	.....	.....	.....	.....	.....	.....
Phlebitis.....	2	.....	.....
Varix.....	2	1	1	.....	.....	.....	11	.....	13
DISEASES OF THE RESPIRATORY SYSTEM.....										
Hay fever.....	2	86	46	34	1	6	1	648	.....	736
Inflammation of mucous membrane of larynx—	1	.....	.....
Catarrhal, acute.....	15	.....	15
Catarrhal, chronic.....	1	.....	.....
Aphonia.....	1	.....	.....
Tracheitis.....	2	.....	.....
Bronchitis—
Catarrhal, acute.....	36	24	11	.....	1	.....	558	.....	594
Catarrhal, chronic.....	2	.....	2	.....	.....	.....	45	.....	47
Spasmodic asthma.....	1	2	.....	3	.....	.....	.....	5	.....	.....
Congestion of lung.....	1	.....	.....	.....	1	.....	.....	.....	.....
Hæmorrhage of lung.....	1	.....	1	.....	.....	.....	.....	.....	.....
Hæmoptysis.....	1	1	.....	.....	.....	.....	5	.....	.....
Pneumonia.....	23	13	5	.....	4	1	1	.....	24
Broncho-pneumonia.....	2	1	1	.....	.....	.....	.....	.....	.....

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE RESPIRATORY SYSTEM—Continued.									
Phthisis—									
Acute.....		1		1					1
Chronic.....		3	1	1	1				3
Tubercular.....		1		1				1	2
Emphysema.....		1		1					1
Pleurisy—									
Acute.....		10	4	6				9	19
Chronic.....		1		1				4	5
Empyema.....	1	1	2						2
DISEASES OF THE DIGESTIVE SYSTEM.....	5	126	82	33	8	5	3	1, 136	1, 267
Inflammation of the lips.....								1	1
Ulceration of the lips.....								1	1
Inflammation of the mouth.....								4	4
Ulceration of the mouth.....								5	5
Caries of dentine and cementum.....								39	39
Necrosis of dentine and cementum.....								4	4
Abscess of dental periosteum.....		1	1					9	10
Inflammation of gums and alveoli.....								4	4
Suppuration of the alveoli.....								1	1
Ulceration of gums and alveoli.....								6	6
Toothache.....								22	22
Ulceration of the tongue.....								1	1
Sore throat.....		1	1					59	60
Ulceration of the palate.....								1	1
Inflammation of tonsils—									
Follicular.....	1	18	13	6				51	70
Suppuration.....		3	3					3	6
Hypertrophy of tonsils.....								1	1
Elongated uvula.....								1	1
Salivation.....								1	1
Inflammation of the pharynx—									
Catarrhal.....								31	31
Granular.....								12	12
Follicular.....								10	10
Ulceration of pharynx.....								1	1
Stricture of œsophagus.....								1	1
Inflammation of the stomach—catarrhal.....		10	8	1		1		37	47
Ulceration of the stomach—superficial.....								1	1
Hæmorrhage of the stomach.....								1	1
Indigestion.....		6	5	1				228	234
Nausea.....								2	2
Gastralgia.....								11	11
Loss of appetite.....								3	3
Inflammation of the intestines—									
Enteritis.....		4	3	1				1	5
Typhlitis.....	1	6	3	2		1	1	2	9
Colitis.....		2	2					3	5
Catarrhal.....		5	4	1				40	45
Ulceration of the intestines.....		1					1		1
Fæcal accumulation.....		4	4						4
Hernia.....	1	7	2	4	2			94	102
Stricture of the intestines.....		3		1		1	1		3
Intestinal dyspepsia.....								3	3
Constipation.....		2	2					162	164
Colic.....								4	4
Diarrhœa.....		23	17	6				164	187
Enteralgia.....								4	4
Ulceration of the anus.....								2	2
Fissure of the anus.....		1	1						1
Fistula in ano.....	1	5	4	2				11	17

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.				Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.	Died.			
Local Diseases—Continued.									
DISEASES OF THE GENERATIVE SYSTEM—Continued.									
Pruritus of the scrotum							7	7	
Varicocele	1	12	2	1			21	24	
Hydrocele of tunica vaginalis		12	2				7	9	
Inflammation of the testicle—									
Acute orchitis	1	11	4	8			21	33	
Chronic orchitis							2	2	
Epididymitis		7	5	2			25	32	
Abscess of testicle		1		1				1	
Spermatorrhœa							4	4	
Impotence							3	3	
Inflammation of the vagina							1	1	
Amenorrhœa							1	1	
DISEASES OF THE ORGANS OF LOCOMOTION.									
Inflammation of the bones—		28	12	12	1	3	179	207	
Osteitis		1	1				3	4	
Periostitis		1	1				5	6	
Caries		4	1	2	1		2	6	
Necrosis		2	1			1		2	
Hypertrophy of the bones							1	1	
Inflammation of joints, synovitis, acute		7	2	4		1	8	15	
Inflammation of joints, synovitis, chronic		1		1			1	2	
Ankylosis		3	1	2				3	
Psoas, lumbar, and other abscesses		2		1		1		2	
Posterior curvature of spine, angular		1		1				1	
Inflammation of muscles							8	8	
Suppuration of muscles							1	1	
Myalgia		5	4	1			144	149	
Contraction of fasciæ							1	1	
Inflammation of tendons		1	1				1	2	
Thecal abscess							1	2	
Bursal cyst							3	3	
DISEASES OF THE CONNECTIVE TISSUE ..									
Inflammation	4	31	19	14	1	1	88	123	
Abscess		9	7	2			24	33	
Edema	4	22	12	12	1	1	60	86	
							4	4	
DISEASES OF THE SKIN									
Erythema	1	40	20	18		3	457	498	
Roseola							2	2	
Urticaria							5	5	
Eczema		1		1			15	16	
Prurigo		2		2			86	88	
Lichen							2	2	
Psoriasis		1	1				1	2	
Herpes							2	2	
Zona							14	14	
Pemphigus							4	4	
Dermatitis herpetiformis							2	2	
Acne							3	3	
Sycosis							12	12	
Seborrhœa							2	2	
Ichthyosis							6	6	
Chilblain							5	5	
Ulcer							3	3	
Boil	1	18	9	7		3	146	165	
Carbuncle		5	4	1			87	92	
Whitlow		3	2	1			15	18	
		8	3	5			20	28	

[illegible]

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

SOUTH ATLANTIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Sprain of the elbow		1	1					3	4
Sprain of the wrist		1	1					14	15
Sprain of the finger								4	4
Wound of the upper extremities	1	68	50	16	2		1	169	238
Fracture of the clavicle		1		1					1
Fracture of the scapula								2	2
Fracture of the humerus		4	3	1					4
Fracture of the bones of the forearm—									
Radius		2	1	1				1	3
Ulna		1	1					4	5
Both bones		1	1						1
Fracture of carpus, metacarpus, or phalanges		1	1					3	4
Dislocation of the clavicle		1		1					1
Dislocation of the humerus		4	4					4	8
Dislocation of the phalanges of fingers								1	1
Contusion of the lower extremities		23	14	9				32	55
Sprain of the hip								1	1
Sprain of the knee		2	1	1				6	8
Sprain of the ankle	2	4	4	2				17	23
Internal derangement of joints								1	1
Wound of the lower extremities		15	8	6			1	29	44
Fracture of femur	1	3	2	1			1		4
Fracture of tibia	1	3	4					1	5
Fracture of tibia and fibula	1	10	6	5					11
Fracture of the bones of the foot—of the metatarsus		2	2					2	4
Dislocation of the tibia		1					1		1
Dislocation of the astragalus								1	1
Dislocation of the metatarsus and phalanges		1	1						1

GULF.

TOTAL CASES.....	71	1,458	856	481	38	45	109	5,128	6,657
General Diseases.....	28	675	414	195	13	18	63	2,198	2,901
Smallpox.....		1			1			1	2
Cowpox.....								30	30
Measles.....		9	4				5		9
Dengue.....		36	34	2				28	64
Influenza.....		10	9		1			17	27
Mumps.....		11	8				3	1	12
Diphtheria.....	1		1						1
Simple continued fever.....		2	2					1	3
Enteric fever.....		16	6	2		2	6	1	17
Typho-malarial fever.....		2	2						2
Choleraic diarrhoea.....		1	1					1	2
Dysentery.....		27	19	2		2	4	42	69
Yellow fever.....		22	20			1	1	1	23
Malarial fever:									
Intermittent.....	7	153	137	10			13	471	631
Remittent.....	1	117	75	33		2	8	36	154
Erysipelas.....		1	1						1
Tetanus.....		1				1			1
Tubercle.....	4	21		18	3	6	4	81	112
Syphilis:									
Primary.....		12	4	5			3	65	77
Secondary.....	9	63		58	2	2	10	306	378

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

GULF—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
General Diseases—Continued.									
Gonorrhœa.....	4	52	27	26	2	1	462	518	
Diseases dependent on animal parasites:									
Tania mediocanellata.....		1	1				1	2	
Pediculus capitis.....							1	1	
Phthirus inguinalis.....							2	2	
Sarcoptes scabiei.....							8	8	
Diseases dependent on vegetable parasites:									
Achorion Schönleini.....							3	3	
Trichophyton tonsurans.....							19	19	
Effects of vegetable poisons							3	3	
Morphine.....		1		1				1	
Effects on inorganic poisons:									
Lead colic.....		1	1				1	2	
Mercury.....		1	1				1	2	
Effects of the presence of foreign bodies		1		1			2	3	
Alcoholism.....		12	11			1	9	21	
Rheumatic fever.....		18	10	6		2	4	23	
Rheumatism.....	1	67	36	29	2	1	494	562	
Gout.....				29			2	2	
Cyst.....							5	5	
New growth, nonmalignant:									
Lipoma.....							1	1	
Chondroma.....		1			1			1	
Condyloma.....		1	1				2	3	
Papilloma.....							11	11	
Pterygium.....							2	2	
New growth, malignant:									
Sarcoma.....		1		1					1
Carcinoma.....	1	1	1			1	1	3	
Squamous carcinoma.....		2	1				1	3	5
Anæmia.....		1		1			1	2	
Diabetes mellitus.....							6	6	
Diabetes insipidus.....							1	1	
Debility.....		3	1	1			1	71	74
Local Diseases.....	33	573	286	239	20	21	40	2,455	3,061
DISEASES OF THE NERVOUS SYSTEM.....	9	27	14	13	3	4	2	155	191
Of the nerves—									
Inflammation—									
Neuritis.....							6	6	
Multiple neuritis.....		1				1	1	2	
Of the spinal cord and membranes—									
membranes—									
Inflammation—of dura mater.....		1		1					1
Of the spinal cord and membranes—									
cord—									
Degeneration—of posterior col- umnus.....	1			1					1
Of the brain and its membranes—									
membranes—									
Inflammation—									
Of dura mater.....	1		1						1
Of pia mater and arachnoid...	1						1		1
Anæmia—general.....							1		1
Of the brain and its membranes—									
brain—									
Inflammation.....	1		1						1
Hæmorrhage.....	1					1			1
Functional nervous disorders, with other diseases of undetermined na- ture—									
Apoplexy.....	1	2	1	1		1			3

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

GULF—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE CIRCULATORY SYSTEM—Continued.									
Obstruction of veins.....								1	1
Varix		4		2			2	5	9
DISEASES OF THE RESPIRATORY SYSTEM.....									
Inflammation of mucous membrane of larynx—	4	97	45	37	7	5	7	496	597
Catarrhal, acute.....		2	2					4	6
Suppurative		1			1				1
Bronchitis—									
Catarrhal, acute.....		36	22	11	2		1	418	454
Catarrhal, chronic.....	3	10	1	10	1	1		43	56
Spasmodic asthma.....		8	3	5				13	21
Hæmorrhage of lung.....		1		1					1
Hæmoptysis.....		1		1				1	2
Pneumonia.....	1	16	12	1		2	2	4	21
Broncho-pneumonia.....		2	2					1	3
Phthisis—									
Acute.....		1			1			1	2
Chronic.....		1				1			1
Tubercular.....		12		6	2	1	3	4	16
Pleurisy—									
Acute.....		6	3	2			1	6	12
Chronic.....								1	1
DISEASES OF THE DIGESTIVE SYSTEM.....									
Ulceration of the lips.....	3	139	78	52	3	3	6	854	996
Inflammation of the month.....								2	2
Ulceration of the month.....								3	3
Caries of dentine and cementum.....								1	1
Necrosis of dentine and cementum.....								41	41
Abscess of dental periosteum.....								1	1
Suppuration of the gums.....								3	3
Toothache.....								1	1
Ulceration of the tongue.....								11	11
Sore throat.....		2	1	1				1	1
Ulceration of the fauces.....		1	1					14	16
Inflammation of tonsils—									1
Follicular.....		2	1	1				20	22
Suppuration.....		2	1	1				3	5
Salivation.....		1			1			1	2
Inflammation of the pharynx—									
Catarrhal.....		2		2				7	9
Follicular.....								2	2
Ulceration of pharynx.....		1	1						1
Inflammation of the stomach—catarrhal.....		30	17	13				44	74
Indigestion.....		7	3	4				214	221
Pyrosis.....								2	2
Gastralgia.....								2	2
Loss of appetite.....								1	1
Inflammation of the intestines—									
Enteritis.....		8	7	1				1	9
Typhlitis.....		4	3	1					4
Colitis.....	1	5	4	2				3	9
Catarrhal.....		4	2	1	1			10	14
Fæcal accumulation.....		2	2						2
Hernia.....		6		6				98	104
Intestinal dyspepsia.....	1	1		1		1			2
Constipation.....		1	1					171	172
Colic.....		2	2					20	22
Diarrhea.....		25	17	5			3	94	119
Periproctitis—Abscess.....		2		1			1	1	3

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

GULF—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Ulceration of the rectum.....		3	2	1					3
Fistula in ano.....	1	3	3		1			7	11
Piles—									
Internal.....		6	3	3				12	18
External.....		2		2				30	32
Mixed.....		1	1					7	8
Pruritus ani.....								6	6
Inflammation of the liver—									
Acute.....		1	1						1
Chronic.....		4		2		1	1	1	5
Hyperæmia of the liver.....		2	2					15	17
Hypertrophy of the liver.....								1	1
Jaundice.....		2		2				2	4
Inflammation of hepatic ducts and gall bladder.....		5	3	1		1		1	6
Calculi.....		1					1		1
Inflammation of the peritonæum.....		1		1					1
DISEASES OF THE LYMPHATIC SYSTEM....	1	56	31	23	1		2	66	123
Hypertrophy of the spleen.....								1	1
Inflammation of lymph glands.....		40	22	15	1		2	60	100
Suppuration.....	1	16	9	8				5	22
DISEASES OF THE THYROID BODY.....									
Goitre.....								1	1
DISEASES OF THE URINARY SYSTEM.....									
Acute nephritis.....	2	16	5	10		1	2	47	65
Bright's disease.....	1	1	1					3	4
Hæmaturia.....		8		7		1	1	5	14
Phosphaturia.....		1	1					5	6
Hæmoglobinuria.....								10	10
Inflammation of bladder—								1	1
Acute.....		3	1	2				9	12
Subacute.....								1	1
Chronic.....	1	1	1				1	9	11
Irritability of bladder.....								2	2
Retention of urine.....		1	1						1
Incontinence of urine.....		1		1				2	3
DISEASES OF THE GENERATIVE SYSTEM....									
Urethritis.....	5	86	40	41	1	2	7	246	337
Gleet.....								2	2
Abscess of the urethra.....		1	1					1	2
Stricture of urethra—									
Organic.....	2	15	5	10		1	1	37	54
Spasmodic.....								1	1
Hypertrophy of the prostate.....								2	2
Phimosis.....		5	2	2	1				5
Paraphimosis.....								1	1
Inflammation of the penis—of the glans.....									
Soft chancre.....	2	48	21	23		1	5	138	188
Varicocele.....		1		1				10	11
Hydrocele of tunica vaginalis.....		3	1	1			1	6	9
Inflammation of the testicle—									
Acute orchitis.....	1	9	6	4				16	26
Chronic orchitis.....								3	3
Epididymitis.....		4	4					8	12
Spermatorrhœa.....								6	6
Impotence.....								4	4
Inflammation of the male breast.....								1	1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

GULF—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE ORGANS OF LOCOMOTION.	1	22	12	10			1	115	138
Inflammation of the bones—									
Osteitis		1		1					1
Periostitis		4	2	2				3	7
Caries		2	2					4	6
Necrosis		1					1	1	2
Inflammation of joints, synovitis, acute.		4	1	3				1	5
Inflammation of joints, synovitis, chronic.	1		1					1	2
Myalgia		6	4	2				97	103
Inflammation of the fasciæ		1		1					1
Inflammation of tendons								2	2
Ganglion		1		1				1	2
Thecal abscess		1	1					1	2
Inflammation of bursæ		1	1					3	4
Bunion								1	1
DISEASES OF THE CONNECTIVE TISSUE.	1	29	21	7			2	57	87
Inflammation		17	11	5			1	21	38
Abscess	1	11	9	2			1	34	46
Gangrene		1	1						1
Edema								2	2
DISEASES OF THE SKIN.	2	54	35	15	2		4	242	298
Erythema		1	1					1	2
Urticaria								1	1
Prickly heat		1	1					4	5
Eczema		2	1	1				42	44
Impetigo								1	1
Pityriasis rubra								1	1
Psoriasis								1	1
Herpes								1	1
Zona		1	1					10	11
Pemphigus								3	3
Acne								2	2
Gutta serena								1	1
Sycosis								1	1
Seborrhœa								2	2
Chilblain								3	3
Cicatrix	1	28	14	10	2		3	100	129
Carbuncle		9	7	2				56	65
Whitlow		5	5						5
Onychia		5	2	2			1	6	11
Corn		1	1						1
Ainhum								1	1
Hyperidrosis		1	1					3	4
Pruritus								1	1
Lupus	1		1					1	2
Injuries	10	210	156	47	5	6	6	475	695
GENERAL INJURIES.	2	33	30	3		2		31	66
Effects of heat—									
Burns and scalds		20	17	3				25	45
Heat stroke	2	12	12			2		2	16
Sunstroke.								1	1
Effects of chemical irritants and corrosives		1	1					3	4
LOCAL INJURIES.	8	177	126	44	5	4	6	444	629
Contusion of muscles		3	3					1	4
Strain of muscles		1		1				5	6
Abrasion of skin		3	2	1				9	12

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

GULF—Continued.

Diseases.	Number of cases.									
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.	
			Recovered.	Improved.	Not improved.					
Injuries—Continued.										
LOCAL INJURIES—Continued.										
Frostbite.....		1	1					26	27	
Contusion of scalp.....		2	2					4	6	
Wound of scalp.....		3	2	1				9	12	
With injury to the aponeurosis.....		6	6					6	12	
Contusion of skull.....		1	1						1	
Fracture of the vault of the skull.....		2	2						2	
Concussion of brain.....		1	1					3	4	
Contusion of face.....		2	2					3	5	
Wound of face and mouth.....		7	6	1				7	14	
Fracture of facial bones.....		1	1						1	
Wound of eyelid.....								1	1	
Wound of conjunctiva.....								1	1	
Contusion of the eyeball.....								1	1	
Foreign bodies in the conjunctiva or cornea.....								5	5	
Wound of pinna.....								1	1	
Contusion of the chest.....		5	3	2				25	30	
Fracture of the ribs.....		2	1			1		2	4	
Wound of parietes of chest.....		1	1						1	
Gunshot wound of chest.....		2				1	1		2	
Contusion of back.....		8	5	2	1			12	20	
Sprain of back.....		6	5	1				26	32	
Wound of back.....								1	1	
Contusion of abdomen.....		5	4	1				1	6	
Wound of parietes of abdomen.....		4	2	1		1			4	
Contusion of the pelvis.....		1	1						1	
Wound of the male urethra, perineum, scrotum, testis, or penis.....								2	2	
Contusion of testicle.....								1	1	
Contusion of the upper extremities.....		8	4	3	1			36	44	
Sprain of the shoulder.....								6	6	
Sprain of the elbow.....								2	2	
Sprain of the wrist.....		1		1				21	22	
Sprain of the thumb.....								3	3	
Sprain of the fingers.....								6	6	
Wound of the upper extremities.....	1	21	14	8				90	112	
Wound of joint, upper extremities.....		1		1				1	2	
Fracture of the clavicle.....		4	3	1					4	
Fracture of the humerus.....		1		1					1	
Fracture of the bones of the forearm—										
Radius.....		3	1	1	1				3	
Ulna.....		2	1	1				2	4	
Both bones.....	1		1					1	2	
Fracture of carpus, metacarpus, or phalanges.....		3	1	1			1	6	9	
Dislocation of the clavicle.....								2	2	
Dislocation of scapula.....		1	1						1	
Dislocation of the humerus.....		4	4						4	
Contusion of the lower extremities.....	1	12	12		1			48	61	
Sprain of the hip.....		1	1					1	2	
Sprain of the knee.....		3	3					21	24	
Sprain of the ankle.....		7	4	3				19	26	
Internal derangement of joints.....		1	1					1	2	
Wound of the lower extremities.....	1	24	17	6	1		1	26	51	
Wound of joint, lower extremities.....		1	1			1			2	
Fracture of femur.....	2		1	1					2	
Fracture of tibia.....		1		1					1	
Fracture of tibia and fibula.....		6	2	3			1		6	
Fracture of the bones of the foot—										
Of the tarsus.....	1	2	1				2		3	
Of the metatarsus.....		3	2	1					3	

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

OHIO—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Caries of dentine and cementum								5	5
Abscess of dental periosteum								1	1
Inflammation of gums and alveoli								1	1
Suppuration of gums and alveoli		2	1	1					2
Toothache								3	3
Inflammation of the tongue								1	1
Ulceration of the tongue								1	1
Sore throat								3	3
Inflammation of tonsils—									
Follicular		5	3	2				15	20
Suppuration		2	2						2
Inflammation of salivary glands		2	1	1					4
Salivary fistula								2	2
Inflammation of the pharynx—									
Catarrhal		1	1					8	9
Granular								22	22
Follicular		1	1					3	4
Ulceration of pharynx		1	1						1
Inflammation of the stomach—catarrhal	1	11	9	2		1	53		65
Hæmorrhage of the stomach		1	1						1
Indigestion		1		1				142	143
Gastralgia								21	21
Heartburn								1	1
Loss of appetite								1	1
Inflammation of the intestines—									
Enteritis		6	4	2				2	8
Typhlitis		2		1		1			2
Catarrhal		12	12					29	41
Hernia		3			3			43	46
Obstruction of the intestines		1	1						1
Intestinal dyspepsia								4	4
Constipation		1	1					57	58
Colic		3	2	1				1	4
Diarrhoea	3	25	23	3		1	1	60	88
Fistula in ano	1	5	4	2				4	10
Piles—									
Internal								5	5
External		2	1	1				25	27
Mixed		1				1			1
Inflammation of the liver—									
Acute								26	26
Acute abscess		1		1					1
Chronic		1		1				1	2
Hyperæmia of the liver								1	1
Jaundice								4	4
Inflammation of hepatic ducts and gall bladder									
Dropsy		2	2					1	3
DISEASES OF THE LYMPHATIC SYSTEM		30	23	5			2	32	62
Hypertrophy of the spleen		1	1						1
Inflammation of lymph glands		21	15	5			1	27	48
Suppuration		7	6				1	3	10
Hypertrophy of lymph glands								1	1
Inflammation of lymphatics		1	1					1	2
DISEASES OF THE URINARY SYSTEM	2	12	5	8			1	56	70
Acute nephritis		2	1	1				4	6
Bright's disease		3		3				5	8
Calculus in ureter				1				1	1
Movable kidney		1		1					1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

OHIO—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE URINARY SYSTEM—Continued.									
Lithuria								9	9
Inflammation of bladder—									
Acute		4	3	1				20	24
Subacute								12	12
Chronic	1	2	1	1			1	2	5
Irritability of bladder								2	2
Retention of urine	1			1					1
Incontinence of urine								1	1
DISEASES OF THE GENERATIVE SYSTEM ...	2	54	36	19			1	144	200
Urethritis								3	3
Gleet								7	7
Stricture of urethra—									
Organic	2	7	6	3				21	30
Spasmodic		1	1						1
Hypertrophy of the prostate								2	2
Phimosis		4	2	2					4
Inflammation of the penis—of the glands								5	5
Soft chancre		26	14	12				82	108
Abscess of the scrotum								1	1
Inflammation of the spermatic cord		1	1						1
Varicocele								4	4
Hydrocele of tunica vaginalis		2	2					5	7
Inflammation of the testicle—									
Acute orchitis		5	4				1	7	12
Epididymitis		8	6	2				5	13
Impotence								1	1
Inflammation of the ovary								1	1
DISEASES OF THE ORGANS OF LOCOMOTION.	2	22	16	7			1	91	115
Inflammation of the bones—Osteitis		1		1					1
Necrosis	1	1		1			1		2
Inflammation of joints, synovitis, acute		3	1	2				3	6
Inflammation of joints, synovitis, chronic		2	2						2
Anterior curvature of spine	1			1					1
Suppuration of muscles		1		1				1	2
Myalgia		14	13	1				81	95
Inflammation of tendons								4	4
Ganglion								1	1
Inflammation of bursæ								1	1
DISEASES OF THE CONNECTIVE TISSUE ...		13	9	3			1	13	26
Inflammation		7	6	1				4	11
Abscess		6	3	2			1	9	15
DISEASES OF THE SKIN.		33	19	13			1	146	179
Erythema								2	2
Urticaria								7	7
Prickly heat								2	2
Eczema		5	2	2			1	37	42
Psoriasis								2	2
Sudamina								1	1
Herpes								7	7
Acne								4	4
Sycosis								2	2
Chilblain		1	1					2	3
Ulcer		13	6	7				45	58
Boil		4	3	1				20	24

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

OHIO—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospitals and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE SKIN—Continued.									
Carbuncle.....		3	3					4	7
Whitlow.....		2	1	1				3	5
Onychia.....		4	2	2				3	7
Tylosis.....								1	1
Corn.....								1	1
Cheloid.....								1	1
Wen.....		1	1					1	1
Hyperidrosis.....								1	1
Lupus.....								1	1
Injuries.....	7	166	113	49	1	1	9	253	426
GENERAL INJURIES.									
Effects of heat—		7	4			1	2	10	17
Burns and scalds.....		3	3					9	12
Heatstroke.....		1	1						1
Effects of chemical irritants and corrosives.....		2					2	1	3
Shock.....		1				1			1
LOCAL INJURIES.	7	159	109	49	1		7	243	409
Contusion of muscles.....								3	3
Strain of muscles.....								9	9
Rupture of muscles.....		1	1						1
Wound of muscles.....								1	1
Strain of tendons.....								1	1
Abrasion of skin.....								2	2
Frostbite.....		3	2	1					3
Wound of the scalp.....		5	3	2				9	14
With injury to the aponeurosis.....		4	4						4
Fracture of the vault of the skull.....		1	1						1
Contusion of face.....								4	4
Wound of face and mouth.....		3	2	1				7	10
Fracture of facial bones.....		1	1						1
Contusion of the eyelid.....								1	1
Wound of eyelid.....	1		1						1
Contusion of the eyeball.....		3	3						3
Foreign bodies in the conjunctiva or cornea.....								2	2
Wound of pinna.....		1	1					2	3
Wound of neck.....		1	1						1
Contusion of the chest.....		4	2					8	12
Fracture of the ribs.....		3		3				3	6
Gunshot wound of chest.....	1	1	2						2
Contusion of back.....		4	4					4	8
Sprain of back.....		10	6	3			1	32	42
Wound of back.....		1	1						1
Contusion of abdomen.....								3	3
Contusion of the pelvis.....		1	1						1
Contusion of the male urethra, perineum, scrotum, or penis.....								1	1
Contusion of the upper extremities.....	1	12	10	2	1			41	54
Sprain of the shoulder.....								3	3
Sprain of the elbow.....								2	2
Sprain of the wrist.....								12	12
Sprain of the thumb.....								1	1
Sprain of the fingers.....								2	2
Wound of the upper extremities.....	2	29	19	12				34	65
Fracture of the clavicle.....		1	1					1	2
Fracture of the bones of the forearm—									
Radius.....								4	4
Ulna.....		1	1						1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES
TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE MISSISSIPPI—Continued.

[illegible]

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE MISSISSIPPI—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE RESPIRATORY SYSTEM.....		61	44	9	1	6	1	136	197
Inflammation of mucous membrane of larynx—									
Catarrhal, acute.....		1	1					1	2
Catarrhal, chronic.....								1	1
Bronchitis—									
Catarrhal, acute.....		28	22	6				117	145
Catarrhal, chronic.....								7	7
Spasmodic asthma.....		2		2				1	3
Congestion of lung.....		2	1	1				2	2
Pneumonia.....		17	12			5		1	18
Phthisis—Tubercular.....		1			1				1
Pleurisy—									
Acute.....		9	8			1		5	14
Chronic.....		1					1	2	3
Adhesions of pleura.....								1	1
DISEASES OF THE DIGESTIVE SYSTEM.....	2	68	39	23	3	3	2	347	417
Inflammation of the mouth.....								3	3
Ulceration of the mouth.....								3	3
Caries of dentine and cementum.....								8	8
Inflammation of gums and alveoli.....								1	1
Toothache.....								1	1
Sore throat.....								5	5
Inflammation of tonsils—									
Follicular.....		1	1					12	13
Suppuration.....		1					1	1	2
Elongated uvula.....								1	1
Salivation.....		1	1						1
Inflammation of the pharynx—									
Catarrhal.....								3	3
Follicular.....								11	11
Inflammation of the stomach—Catarrhal.....		12	7	4		1		39	51
Indigestion.....		5	3	2				38	43
Loss of appetite.....								2	2
Inflammation of the intestines—									
Typhlitis.....		1		1					1
Colitis.....		2	1	1				4	6
Catarrhal.....		23	12	7	2	1	1	16	39
Fæcal accumulation.....		1	1						1
Hernia.....		3	1	2				63	66
Constipation.....	1	1	2					63	65
Colic.....		2	2					3	5
Diarrhoea.....		4	4					45	49
Fistula in ano.....		1	1					2	3
Piles—									
Internal.....		1		1				2	3
External.....		3		2	1			17	20
Mixed.....		1		1					1
Inflammation of the liver, chronic.....	1					1			1
Hyperæmia of the liver.....		1	1					2	3
Jaundice.....								1	1
Inflammation of hepatic ducts and gall bladder.....		3	1	2					3
Inflammation of the peritonæum.....		1	1					1	2
DISEASES OF THE LYMPHATIC SYSTEM.....		18	5	7	3			12	30
Hypertrophy of the spleen.....	1	1		1					1
Inflammation of lymph glands.....		6	2	3	1			11	17
Suppuration.....		11	3	3	2		3	1	12

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE MISSISSIPPI—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE URINARY SYSTEM.....	1	5	2	2	2			23	29
Acute nephritis.....		1	1					1	2
Bright's disease.....		1		1				2	3
Calculus in kidney.....								1	1
Movable kidney.....								1	1
Suppression of urine.....								1	1
Hæmaturia.....		1			1			1	1
Lithuria.....		2	1		1			2	4
Inflammation of bladder—									
Acute.....								9	9
Chronic.....	1			1				1	2
Irritability of bladder.....								1	1
Retention of urine.....								1	1
Incontinence of urine.....								3	3
DISEASES OF THE GENERATIVE SYSTEM...	3	63	30	28	2	2	4	106	172
Urethritis.....								3	3
Stricture of urethra—Organic.....		12	3	6		2	1	21	33
Prostatorrhœa.....								2	2
Hypertrophy of the prostate.....	1			1				1	2
Phimosi.....		1	1					1	2
Soft chancre.....	2	42	21	18	2		3	58	102
Hydrocele of the spermatic cord.....		2	2						2
Varicocele.....								2	2
Hydrocele of tunica vaginalis.....		1	1					3	4
Inflammation of the testicle—									
Acute orchitis.....		3	1	2				8	11
Chronic orchitis.....								2	2
Epididymitis.....		1		1				1	2
Impotence.....								1	1
Inflammation of the uterus.....		1	1					2	3
Leucorrhœa.....								1	2
DISEASES OF THE ORGANS OF LOCOMOTION.....		9	4	4			1	16	25
Inflammation of the bones—Periostitis.....								2	2
Necrosis.....		3	1	2				1	4
Inflammation of joints, synovitis—									
Acute.....		1	1						1
Chronic.....		1		1					1
Dislocation of articular cartilage.....								2	2
Psoas, lumbar, and other abscesses.....								1	1
Myalgia.....		2	1	1				8	10
Inflammation of tendons.....								1	1
Inflammation of bursæ.....		1	1					1	2
Bunion.....		1					1		1
DISEASES OF THE CONNECTIVE TISSUE.....		18	9	8			1	19	37
Inflammation.....		5	4	1				8	13
Abscess.....		12	5	6			1	11	23
Emphysema.....		1		1					1
DISEASES OF THE SKIN.....		38	18	15			5	79	117
Urticaria.....		1	1					3	4
Prickly heat.....								1	1
Eczema.....		2	1	1				19	21
Herpes.....								7	7
Zona.....								1	1
Acne.....								1	1
Sycosis.....								1	1
Ulcer.....		27	11	11			5	11	38
Boil.....		4	2	2				18	22
Carbuncle.....		1		1				6	6
Whitlow.....		3	3					6	6

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE MISSISSIPPI—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE SKIN—Continued.									
Onychia.....								1	1
Corn.....								2	2
Wen.....								2	2
Pruritus.....								1	1
Injuries.....	10	161	107	47		4	13	227	398
GENERAL INJURIES.....									
Effects of heat—		16	9	3		3	1	9	25
Burns and scalds.....		8	2	2		3	1	8	16
Heatstroke.....		7	7					1	8
Effects of cold.....		1		1					1
LOCAL INJURIES.....									
Compression of nerves.....	10	145	98	44		1	12	218	373
Contusion of muscles.....		1	1					1	1
Strain of muscles.....		1	1					3	4
Strain of tendons.....								1	1
Abrasion of skin.....				1				1	2
Contusion of scalp.....		2	2					2	4
Wound of the scalp.....		5	3	2				7	12
With injury to the aponeurosis.....		2	2					4	6
Contusion of face.....		1	1					2	3
Wound of face and mouth.....		5	5					4	9
Fracture of facial bones.....		2	1	1				2	4
Foreign bodies in the conjunctiva or cornea.....								3	3
Foreign bodies in the eyeball.....								1	1
Wound of neck.....		2	1			1			2
Contusion of chest.....		3	2	1				8	11
Fracture of the ribs.....		1	1					1	2
Wound of parietes of chest.....		3	2	1				1	4
Penetrating wound of pleura or lung.....		1	1						1
Contusion of back.....	1	2	1	2				7	10
Sprain of back.....	1	2	3					22	25
Wound of back.....	1	5	3	1			1	2	7
Wound of parietes of abdomen.....		1	1					1	2
Wound of the male urethra, perineum, scrotum, testis, or penis.....	1	1	2						2
Contusion of the upper extremities.....		7	4	2			1	20	27
Sprain of the shoulder.....								4	4
Sprain of the elbow.....								1	1
Sprain of the wrist.....								11	11
Sprain of the thumb.....								1	1
Sprain of the fingers.....								1	1
Wound of the upper extremities.....		23	14	9				47	70
Fracture of the humerus.....		1	1						1
Fracture of the bones of the forearm—									
Radius.....		2	1	1				1	3
Ulna.....		1	1					1	2
Both bones.....		1		1					1
Fracture of carpus, metacarpus, or phalanges.....		3		2			1	1	4
Dislocation of the clavicle.....		1	1						1
Dislocation of the humerus.....	1		1						1
Contusion of the lower extremities.....	2	18	12	5			3	10	30
Sprain of the knee.....		1	1					6	7
Sprain of the ankle.....		8	5	2			1	18	26
Sprain of the foot.....								1	1
Wound of the lower extremities.....		30	18	9			3	20	50
Wound of joint, lower extremities.....		1		1					1
Fracture of tibia.....	1	1	2						2

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE MISSISSIPPI—Continued.

Diseases.	Number of cases.						
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Remaining under treatment at close of year.	Number furnished office relief.
			Recovered.	Improved.	Not improved.		
Local Diseases—Continued.							
LOCAL INJURIES—Continued.							
Fracture of fibula.....	1	1	1	1	.....	.....	2
Fracture of tibia and fibula.....	2	3	4	1	.....	.....	7
Dislocation of the foot.....	.....	1	.....	.....	.....	1	1
Dislocation of the astragalus.....	.....	1	.....	.....	.....	1	1

THE GREAT LAKES.

TOTAL CASES	140	2,002	1,318	609	41	50	124	8,982	11,124
General Diseases	41	767	480	243	14	22	49	3,743	4,551
Measles .....	.....	11	11	.....	.....	.....	.....	.....	11
Influenza .....	.....	31	29	1	.....	1	.....	98	129
Mumps	1	1	2	.....	.....	.....	.....	1	3
Diphtheria .....	.....	2	2	.....	.....	.....	.....	1	3
Simple continued fever.....	.....	13	10	1	1	.....	1	29	42
Enteric fever	5	68	55	5	1	6	6	2	75
Choleraic diarrhea .....	.....	10	7	1	1	1	.....	40	50
Dysentery .....	.....	4	4	.....	.....	.....	.....	11	15
Malarial fever—									
Intermittent	2	76	70	4	.....	1	3	162	240
Remittent	2	16	15	1	2	.....	.....	31	49
Phagedæna .....	.....	.....	.....	.....	.....	1	.....	1	2
Erysipelas	1	14	14	.....	.....	.....	1	13	28
Pæmia	1	.....	1	.....	.....	.....	.....	.....	1
Septicæmia .....	.....	2	2	.....	.....	.....	.....	.....	2
Tubercle	7	66	.....	47	3	8	15	99	172
Syphilis—									
Primary .....	.....	8	1	4	.....	.....	3	62	70
Secondary	4	71	.....	73	1	1	.....	1,038	1,113
Gonorrhœa	4	75	55	21	.....	.....	3	1,076	1,155
Diseases dependent on animal parasites:									
Tænia solium	1	3	4	.....	.....	.....	.....	10	14
Ascaris lumbricoides.....	.....	.....	.....	.....	.....	.....	.....	1	1
Oxyuris vermicularis.....	.....	1	1	.....	.....	.....	.....	.....	1
Phthirus inguinalis .....	.....	.....	.....	.....	.....	.....	.....	4	4
Sarcoptes scabiei.....	.....	1	.....	1	.....	.....	.....	20	21
Diseases dependent on vegetable parasites:									
Trichophyton tonsurans .....	.....	2	.....	.....	.....	.....	2	19	21
Microsporon furfur .....	.....	.....	.....	.....	.....	.....	.....	2	2
Effects of vegetable poisons .....	.....	.....	.....	.....	.....	.....	.....	6	6
Effects of inorganic poisons .....	.....	.....	.....	.....	.....	.....	.....	4	4
Effects of the presence of foreign bodies.....	.....	.....	.....	.....	.....	.....	.....	3	3
Alcoholism .....	.....	44	35	7	1	1	.....	27	71
Rheumatic fever	1	35	21	12	.....	.....	3	12	48
Rheumatism	9	186	124	57	3	1	10	702	897
Gout .....	.....	.....	.....	.....	.....	.....	.....	1	1
Cyst .....	.....	1	.....	1	.....	.....	.....	10	11
New growth, nonmalignant:									
Lipoma .....	.....	3	3	.....	.....	.....	.....	6	9
Fibroma	1	.....	.....	.....	1	.....	.....	1	2
Chondroma .....	.....	.....	15	.....	.....	.....	.....	2	2
Myoma .....	.....	.....	.....	.....	.....	.....	.....	1	1
Papilloma .....	.....	2	2	.....	.....	.....	.....	9	11
Adenoma	1	.....	.....	.....	.....	.....	1	1	2
Pterygium .....	.....	1	.....	.....	.....	.....	1	2	3
New growth, malignant—Carcinoma .....	.....	3	.....	2	.....	1	.....	1	4
Anæmia .....	.....	.....	.....	.....	.....	.....	.....	7	7
Leucocythæmia .....	.....	1	.....	1	.....	.....	.....	3	4

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office re- lief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
General Diseases—Continued.									
Hæmophilia.....								1	1
Diabetes mellitus.....		1		1				18	19
Diabetes insipidus.....								6	16
Congenital malformations—Phimosis.....	1		1						1
Hypospadiac fissure of urethra.....								1	1
Debility.....	1	13	11	3				199	213
Local Diseases.....	71	820	532	264	21	23	51	4,360	5,251
DISEASES OF THE NERVOUS SYSTEM.....	10	40	15	27		1	7	284	334
Of the nerves:									
Inflammation—									
Neuritis.....		1	1					15	16
Multiple neuritis.....		1		1				1	2
Degeneration—secondary.....		2		1			1	1	3
Of the spinal cord and membranes—									
Cord:									
Degeneration—of posterior col- umns.....	4	1	1	2			2	6	11
Of the brain and its membranes—									
Brain:									
Sclerosis.....		2		2					2
Hæmorrhage.....								3	3
Hyperæmia.....		1	1					10	11
Anæmia.....								3	3
Functional nervous disorders with other diseases of undetermined na- ture:									
Paralysis.....	1			1					1
Hemiplegia.....	4	9	1	8		1	3	2	15
Local paralysis.....	1			1				1	2
Incomplete paralysis.....								3	3
Paralysis from acute disease.....		1	1						1
Chorea.....								2	2
Spasm.....		2	1	1				5	7
Torticollis.....								2	2
Epilepsy.....		2		2				16	18
Vertigo.....		2		2				5	7
Headache.....								29	29
Hyperæsthesia.....								2	2
Neuralgia.....		12	7	4			1	118	130
Hysteria.....								1	1
Nervous weakness.....		2	1	1				43	45
Mania.....								2	2
Melancholia.....		1	1					3	4
Dementia.....								3	3
Mental stupor.....		1		1					1
Delusional insanity.....								8	8
DISEASES OF THE EYE.....	1	20	13	8				107	128
Conjunctivitis.....		5	5					60	65
Keratitis.....								4	4
Ulceration of cornea.....	1	3	2	2				7	11
Iritis.....		5	1	4				6	11
Choroiditis.....								5	5
Congestion of optic disc.....								1	1
Retinitis.....								1	1
Lenticular cataract.....		2	2					2	4
Amblyopia.....								2	2
Disorders of accommodation.....								1	1
Presbyopia.....								1	1
Diplopia.....								1	1
Squint.....		2	2	1					3

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office re- lief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE EYE—Continued.									
Stricture of canalicula		1		1				2	3
Obstruction of nasal duct								5	5
Blepharitis								1	1
Sty								2	2
Abscess of eyelid								2	2
Ecclymiosis of eyelid		1	1						1
Entropion								3	3
Edema of eyelid								1	1
DISEASES OF THE EAR	1	1	1	1				55	57
Inflammation of the external meatus—									
Acute								5	5
Chronic								1	1
Abscess								2	2
Accumulation of wax or epidermis								22	22
Inflammation of the middle ear—									
Nonsuppurative								9	9
Suppurative	1	1	1	1				10	12
Perforation of membrana tympani								3	3
Obstruction of eustachian tube								3	3
DISEASE OF THE NOSE			2		2			87	89
Inflammation of soft parts			2		2			79	81
Diseases of septum—									
Hæmatoma								1	1
Deviations								2	2
Epistaxis								1	1
Inflammation of the naso-pharynx								4	4
DISEASES OF THE CIRCULATORY SYSTEM	11	64	13	36	4	11	11	124	199
Pericarditis		3		3					3
Endocarditis								1	1
Valvular disease—									
Aortic		11		5	1	3	2	13	24
Mitral	6	22		17	1	6	4	61	89
Hypertrophy of heart								2	2
Dilatation of heart		1			1				1
Angina pectoris								1	1
Disordered action of the heart—Irr- egularity		2	1	1				716	718
Arteritis—Endarteritis	2						2		2
Degeneration of arteries—Arterio- capillary fibrosis		1		1				1	2
Aneurysm of arteries	2	7		7	1	1		6	15
Phlebitis	1	2	3					3	6
Varix		15	9	2		1	3	13	28
DISEASES OF THE RESPIRATORY SYSTEM	5	131	83	43	2	3	5	904	1,040
Hay fever								2	2
Inflammation of mucous membrane of larynx—									
Catarrhal, acute		2	1	1				14	16
Aphonia								1	1
Tracheitis								1	1
Bronchitis—									
Catarrhal, acute		63	50	10	1		2	678	741
Catarrhal, chronic		8		7	1			146	154
Spasmodic asthma	1	7	5	3				18	26
Hæmorrhage of lung								1	1
Hæmoptysis		2	1				1	1	3
Pneumonia	2	17	13	4		2		3	22
Chronic interstitial inflammation	1			1					1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE RESPIRATORY SYSTEM—Continued.									
Phthisis—									
Acute.....		4	2	2					4
Chronic.....		6		6				2	8
Tubercular.....		2		1			1		2
Emphysema.....		12		12				2	4
Pleurisy—									
Acute.....	1	16	10	6			1	28	45
Chronic.....								4	4
Empyema.....		2	1			1		3	5
DISEASES OF THE DIGESTIVE SYSTEM.....	18	193	158	36	6	5	6	1,250	1,461
Inflammation of the lips.....								2	2
Ulceration of the lips.....								1	1
Inflammation of the mouth.....								5	5
Ulceration of the mouth.....								4	4
Gangrene of the dental pulp.....								1	1
Caries of dentine and cementum.....								15	15
Abscess of dental periosteum.....		1	1					4	5
Inflammation of gums and alveoli.....								5	5
Suppuration of the gums and alveoli.....		2	2						2
Ulceration of gums and alveoli.....								3	3
Caries of the alveoli.....								2	2
Toothache.....								7	7
Ulceration of the tongue.....								4	4
Sore throat.....		3	3					38	41
Inflammation of tonsils—									
Follicular.....		13	11	2				53	66
Suppuration.....		2	2					2	4
Hypertrophy of tonsils.....		1	1					4	5
Elongated uvula.....								4	4
Salivation.....								1	1
Inflammation of the pharynx—									
Catarrhal.....		2	1	1				28	30
Granular.....								11	11
Follicular.....		3	3					13	16
Inflammation of the stomach—Ca-									
tarrhal.....	2	26	19	6	1		2	105	133
Ulceration of the stomach—Superficial.....		2	2					5	7
Hæmorrhage of the stomach.....		2	2						2
Dilatation of the stomach.....		1						1	2
Indigestion.....		7	1	5			1	243	250
Pyrosis.....								7	7
Vomiting.....								2	2
Gastralgia.....								8	8
Loss of appetite.....								2	2
Inflammation of the intestines—									
Enteritis.....	1	4	3	2				4	9
Typhlitis.....		8	4	3		1		7	15
Colitis.....		2	2					5	7
Catarrhal.....	1	6	6			1		20	27
Fæcal accumulation.....								1	1
Hernia.....	5	36	35	3	1	1	1	123	164
Inflammation of the hernial sacs.....		1		1					1
Intestinal dyspepsia.....								4	4
Constipation.....		1	1					247	248
Colic.....	1	3	4					8	12
Diarrhœa.....	3	23	22	4				129	155
Enteralgia.....								5	5
Inflammation of the anus.....								1	1
Periproctitis—Abscess.....		1	1					3	4
Ulceration of the rectum.....		2		1		1		3	5

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Fissure of the anus								2	2
Fistula in ano		5	3	1	1			5	10
Prolapse of the rectum								1	1
Prolapse of the anus		1		1					1
Piles—Internal		7	6	1				21	23
External	1	4	3	1	1			25	30
Mixed		7	6	1				5	12
Pruritus ani								10	10
Inflammation of the liver—									
Acute		2	1	1				1	3
Chronic	1	3	1	1		2		3	7
Hyperæmia of the liver		4	4					21	25
Hypertrophy of the liver								1	1
Jaundice	3	2	2	1	1		1	8	13
Inflammation of hepatic ducts and gall bladder		2	2					2	4
Accumulation of bile								5	5
Biliary colic		2	2						2
Inflammation of the peritoneum		1	1						1
Dropsy		1	1						1
DISEASES OF THE LYMPHATIC SYSTEM	6	75	56	18	2		5	102	183
Hypertrophy of the spleen								7	7
Inflammation of lymph glands	2	18	15	3	2			71	91
Suppuration	4	57	41	15			5	20	81
Hypertrophy of lymph glands								4	4
DISEASES OF THE THYROID BODY								15	15
Goitre								15	15
DISEASES OF THE SUPRARENAL CAPSULES								1	1
Addison's disease								1	1
DISEASES OF THE URINARY SYSTEM	4	34	10	21	1	3	3	112	150
Acute nephritis		6	3	2		1		12	18
Bright's disease	2	13		11		2	2	9	24
Abscess—perinephritic		2		1			1		2
Nephralgia		1	1						1
Congestion of kidney								1	1
Calculus in kidney								1	1
Calculus in ureter		1	1						1
Pyelitis		3		3				1	4
Movable kidney	1				1				1
Hæmaturia	1		1					1	2
Lithuria								2	2
Phosphaturia								1	1
Inflammation of bladder—									
Acute		2	2					45	47
Subacute								13	13
Chronic		3	1	2				12	15
Calculus of bladder								1	1
Irritability of bladder		1	1					5	6
Retention of urine								1	1
Incontinence of urine		2		2				7	9
DISEASES OF THE GENERATIVE SYSTEM	8	109	74	34	3		6	558	675
Urethritis								30	20
Gleet								53	53
Stricture of urethra—									
Organic	2	23	11	13			1	102	127
Traumatic								1	1
Spasmodic								3	3
Urethral fistula		1			1			1	2

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE GENERATIVE SYSTEM—Continued.									
Inflammation of the prostate—									
Acute		1	1					3	4
Chronic		1	1					2	3
Prostatorrhœa		1		1				11	12
Abscess of the prostate		1	1					1	2
Hypertrophy of the prostate								2	2
Inflammation of the seminal vesicles								2	2
Posthitis								3	3
Phimosis		8	6	2				3	3
Paraphimosis		1	1					3	11
Inflammation of the penis									1
Œdema of penis		2	2					3	5
Soft chancre	2	20	12	8		2	213	235	
Chordee								2	2
Pruritus of the scrotum								1	1
Hydrocele of the spermatic cord								2	2
Varicocele		17	14	1	1	1	24	41	
Inflammation of tunica vaginalis							1	1	
Hydrocele of tunica vaginalis		5	5				17	22	
Inflammation of the testicle—									
Acute orchitis	1	10	8	2		1	12	23	
Chronic orchitis	1	2	2	1			6	9	
Epididymitis		8	3	3	1	1	11	19	
Torsion of the testicle							1	1	
Spermatorrhœa							10	10	
Impotence							3	3	
Inflammation of the ovary		2	2				7	9	
Pelvic peritonitis		1		1				1	
Inflammation of the uterus	1	5	5	1			6	12	
Displacements of the uterus—									
Retroversion	1			1				1	
Retroflexion							2	2	
Laceration of the uterus—									
Of the body of the uterus							1	1	
Of the cervix							2	2	
Inflammation of the vagina							1	1	
Dysmenorrhœa							1	1	
Menorrhagia							1	1	
Metrorrhagia							1	1	
Leucorrhœa							4	4	
Abortion							1	1	
Hypertrophy of the male breast							1	1	
DISEASES OF THE ORGANS OF LOCOMOTION.									
Inflammation of the bones—Periostitis	6	45	34	12	1	4	213	264	
Caries		1		1			7	8	
Necrosis	1	2	3				1	4	
Inflammation of joints, synovitis, acute	1	2	2	1			3	6	
Inflammation of joints, synovitis, chronic	1	11	7	4		1	9	21	
Ankylosis		1		1			2	3	
Relaxation of ligaments		1	1				3	4	
Dislocation of knee joint		1	1				3	3	
Psoas, lumbar, and other abscesses	1					1		1	
Inflammation of muscles		1	1				1	2	
Suppuration of muscles		1		1				1	
Atrophy of muscles		1	1				2	3	
Myalgia	2	16	12	4		2	169	187	
Inflammation of fasciæ							1	1	
Contraction of fasciæ		1	1					1	
Inflammation of tendons							5	5	

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Received.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE ORGANS OF LOCOMOTION—Continued.									
Thecal abscess								2	2
Inflammation of bursaë		3	3					3	6
Bunion								1	1
Flat-foot		12	1		1				12
Bursal cyst		1	1						1
Ganglion								1	1
DISEASES OF THE CONNECTIVE TISSUE.....									
Inflammation		38	32	5			1	69	107
Abscess		13	11	1			1	19	32
Oedema		24	21	3				42	66
Undue formation of fat		1		1				2	3
								6	6
DISEASES OF THE SKIN.....									
Erythema	1	68	43	21	2		3	479	548
Urticaria								7	7
Prickly heat								17	17
Eczema		1	1					7	8
Impetigo		5	1	3			1	118	123
Pityriasis rubra								4	4
Lichen								1	1
Psoriasis		2	1	1				2	2
Herpes								22	24
Zona		1		1				16	16
Pemphigus								4	5
Acne								1	1
Sycosis								21	21
Seborrhœa								5	5
Chloasma								2	2
Alopecia								4	4
Area								3	3
Ulcer		25	17	6	1		1	88	113
Boil		6	5	1				74	80
Carbuncle	1	13	9	4			1	11	25
Whitlow		11	6	4	1			32	43
Onychia		2	2					8	10
Corn								9	9
Cheloid								2	2
Wen								5	5
Hyperidrosis								1	1
Pruritus								4	4
Lupus		2	1	1				8	10
Injuries	28	415	306	102	6	5	24	879	1,322
GENERAL INJURIES.....									
Effects of heat—	3	33	24	5		4	3	56	92
Burns and scalds	3	22	15	4		3	3	54	79
Heat stroke		6	6					1	2
Effects of cold		1	1					1	2
Multiple injury		3	1	1		1			3
Exhaustion		1	1						1
LOCAL INJURIES.....									
Rupture of veins	25	382	282	97	6	1	21	823	1,230
Contusion of muscles		1	1					1	2
Strain of muscles		2	2					6	8
Rupture of muscles		6	3	3				12	18
Strain of tendons		2	2						2
Displacement of tendons								1	1
Abrasion of skin		1	1					1	1
								10	11

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office re- lief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Wound of skin.....								9	9
Frostbite.....								4	4
Effects of irritants.....								3	3
Contusion of scalp.....		3	3					1	4
Wound of the scalp—									
With injury to the aponeurosis		10	10					37	47
With injury to the pericranium.....		1	1						1
With injury to the bone.....		1	1						1
Fracture of the vault of the skull	1			1				1	2
Fracture of the base of the skull.....	1	3	1	2		1			4
Concussion of brain.....		4	2	2				1	5
Contusion of face.....	1	6	4	3				7	14
Wound of face and mouth.....		16	14	1			1	22	38
Fracture of facial bones.....		9	5	4				1	10
Contusion of the eyelid.....		1	1					3	4
Wound of eyelid.....		1	1					1	2
Subconjunctival hæmorrhage.....								2	2
Wound of conjunctiva.....	1		1						1
Contusion of the eyeball.....		1		1				3	4
Foreign bodies in the conjunctiva or cornea.....		1	1					21	22
Wound of the eyeball.....	1	4	2	2	1			4	9
Contusion of pinna.....		1	1					4	5
Wound of pinna.....		1		1				2	3
Foreign body in external meatus.....								1	1
Contusion of neck.....								1	1
Wound of neck.....								1	1
Contusion of the chest.....	1	13	10	3			1	47	61
Fracture of the ribs.....		5	3	2				6	11
Wound of parietes of chest.....								2	2
Contusion of back.....	1	14	13	1	1			20	35
Sprain of back.....	2	15	13	2	1		1	50	67
Wound of back.....		1		1				2	3
Fracture of spine.....		1	1						1
Concussion of cord.....		4	2	1			1		4
Contusion of abdomen.....		1		1				2	3
Wound of parietes of abdomen.....		1	1						1
Contusion of the pelvis.....		1	1						1
Contusion of the male urethra, peri- næum, scrotum, or penis.....		3	2	1					3
Wound of the male urethra, perinæum, scrotum, testis, or penis.....	1	1	2					1	3
Rupture of urethra.....		1	1						1
Fracture or dislocation of pelvic bones.....		1	1						1
Contusion of testicle.....		2	1	1				3	5
Contusion of the upper extremities	2	27	23	5			1	104	133
Sprain of the shoulder.....		5	4	1				8	12
Sprain of the elbow.....								2	2
Sprain of the wrist.....		6	3	2	1			24	30
Sprain of the thumb.....								2	3
Sprain of the fingers.....								3	3
Wound of the upper extremities	3	42	30	13			2	206	251
Wound of joint, upper extremities.....								7	7
Fracture of the clavicle.....		3	2	1				2	5
Fracture of the scapula.....		2		1			1		2
Fracture of the humerus.....		5	3	2				1	6
Fracture of the bones of the forearm—									
Radius.....	2	4	4	1			1	3	9
Ulna.....	1	1	2						2
Both bones.....		2	2						2
Fracture of carpus, metacarpus, or phalanges.....		3	2	1				10	13

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE GREAT LAKES—Continued.

Diseases.	Number of days.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished advice re- lief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Dislocation of the clavicle.....		12	2						2
Dislocation of the humerus.....		33	3					3	6
Dislocation of the radius and ulna.....		3	2				1	5	8
Dislocation of the phalanges of thumb.....								2	2
Contusion of the lower extremities.....	3	51	38	14	1		1	72	126
Sprain of the hip.....								1	1
Sprain of the knee.....		9	6		1		2	7	16
Sprain of the ankle.....		20	16	2			2	20	40
Sprain of the foot.....								3	3
Wound of the lower extremities.....	2	16	10	6			2	38	56
Wound of joint, lower extremities.....		2	2					1	3
Fracture of femur.....		6	2	3			1		6
Fracture of patella.....		2	2						2
Fracture of tibia.....		6	3	2			1		6
Fracture of fibula.....		6	3	3				2	8
Fracture of tibia and fibula.....	2	7	4	4			1	1	10
Fracture of the bones of the foot—									
Of the metatarsus.....		3	2	1				3	6
Of the phalanges of the toes.....		1	1						1
Dislocation of the femur.....		1	1						1
Dislocation of the tibia.....		3	2	1					3
Dislocation of the foot.....		2		1			1		2

THE PACIFIC.

TOTAL CASES.....	112	1,609	933	584	41	69	94	4,465	6,186
General Diseases.....	27	639	336	244	16	24	46	1,825	2,491
Measles.....		44	43			1		3	47
Rubella.....		1	1						1
Scarlet fever.....		1	1						1
Influenza.....		39	30	8			1	108	147
Mumps.....		3	3					3	6
Diphtheria.....		8	8						8
Cerebro-spinal fever.....		5	1	2		2		5	5
Simple continued fever.....		1	1					2	3
Enteric fever.....		34	23	2		2	7	1	35
Typho-malarial fever.....		1	1						1
Choleraic diarrhea.....		5	5						5
Dysentery.....	2	9	9	2				8	19
Malarial fever:									
Intermittent.....		29	24	4			1	80	109
Remittent.....		3	2	1				2	5
Erysipelas.....		8	6	1			1	3	11
Tubercle.....	7	53	2	25	8	11	14	63	123
Leprosy.....	1					1			1
Syphilis:									
Primary.....	1	11	1	9				24	36
Secondary.....	1	97	2	83	4		9	377	475
Gonorrhea.....	3	75	35	39	1		3	584	662
Diseases dependent on animal parasites:									
Taenia solium.....								7	7
Taenia mediocanellata.....		1	1					1	2
Phthirus inguinalis.....								5	5
Sarcoptes scabiei.....								7	7
Diseases dependent on vegetable parasites:									
Trichophyton tonsurans.....								6	6
Microsporon furfur.....		1		1					1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office re- lief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
General Diseases—Continued.									
Effects of animal poisons		1		1					1
Effects of vegetable poisons:									
Opium								1	1
Tobacco								1	1
Rhus		2	1	1				1	3
Effects of inorganic poisons								1	1
Effects of the presence of foreign bodies								3	3
Effects of heat								1	1
Effects of cold		1	1					6	7
Scurvy		3	3						3
Alcoholism		23	19	3	1			12	35
Delirium tremens		4	3	1				1	5
Rheumatic fever		45	30	13			2	6	51
Rheumatism	9	96	64	36		1	4	458	563
Osteoarthritis	1	4	1	3			1	1	6
Cyst—Sebaceous								2	2
New growth, nonmalignant:									
Lipoma		1	1						1
Fibroma		1		1					1
Chondroma		1	1						1
Osteoma		2		2					2
Myxoma		2		1	1			1	3
Neuroma		1	1						1
Papilloma		3	2	1				8	11
Adenoma		1	1						1
New growth, malignant:									
Sarcoma	2	4	2	1		2	1	4	10
Carcinoma		4	1			3		1	5
Squamous carcinoma		1	1						1
Anæmia		5	3	1	1			1	6
Diabetes mellitus		2		1		1		3	5
Debility		3	2	1				29	32
Local Diseases	57	620	359	222	24	38	34	2,002	2,679
DISEASES OF THE NERVOUS SYSTEM	10	27	10	15	2	4	6	81	118
Of the nerves:									
Inflammation—Neuritis								1	1
Of the spinal cord and membranes—									
Cord:									
Degeneration—									
Of lateral columns	2	1		1		1	1		3
Of posterior columns	2	3		2			3		5
Of lateral and posterior col- umns		1					1		1
Of the brain and its membranes—									
Membranes:									
Inflammation—Of pia mater and arachnoid		1				1			1
Of the brain and its membranes—									
Brain:									
Inflammation		2		2					2
Hemorrhage	2	1	1			2			3
Functional nervous disorders with other diseases of undetermined na- ture:									
Apoplexy		1		1					1
Paralysis—									
Paraplegia								1	1
Local paralysis								4	4
Incomplete paralysis	1	1		1			1		2

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE NERVOUS SYSTEM—Continued.									
Functional nervous disorders with other diseases of undetermined nature—Continued.									
Spasm.....								1	1
Epilepsy.....		4	2	2				4	8
Vertigo.....	1			1				4	5
Headache.....								7	7
Neuralgia.....	2	7	7	2				49	58
Aphasia.....		2		2				1	3
Nervous weakness.....								8	8
Melancholia.....		1		1				1	2
Dementia.....		2			2				2
DISEASES OF THE EYE.....	1	7	3	1	1	3	43	51	
Conjunctivitis, catarrhal—acute.....		2	2				36	38	
Keratitis.....		1			1			1	1
Ulceration of cornea.....		1				1		1	1
Opacity of cornea.....		1		1				1	1
Iritis.....		1	1					1	2
Atrophy and degeneration of optic nerve or papilla.....	1	1				2			2
Blepharitis marginalis.....								1	1
Sty.....								1	1
Entropion.....								1	1
Ptosis.....								3	3
DISEASES OF THE EAR.....		12	6	3	1	2	23	35	
Inflammation of the external meatus—									
Acute.....		1	1						1
Abscess.....								1	1
Accumulation in external meatus of wax or epidermis.....								11	11
Inflammation of the middle ear—									
Nonsuppurative.....		1	1					3	4
Suppurative.....		6	3	2		1		6	12
Within the mastoid cells.....		4	1	1		1	1	1	5
Tinnitus.....								1	1
DISEASES OF THE NOSE.....		1		1			32	33	
Inflammation of soft parts.....							32	32	
Inflammation of the naso-pharynx.....		1		1					1
DISEASES OF THE CIRCULATORY SYSTEM..	9	46	8	26	4	14	3	43	98
Endocarditis.....		2	1	1					2
Valvular disease—									
Aortic.....	2	10		6	2	3	1	1	13
Mitral.....	2	16		11	1	5	1	15	33
Degeneration of heart—Fatty.....								1	1
Hypertrophy of heart.....		1		1					1
Dilatation of heart.....		2		1		1		2	4
Angina pectoris.....		1	1					1	2
Disordered action of the heart—Irrregularity.....								6	6
Aneurysm of arteries.....	2	3				5		1	6
Phlebitis.....		1		1					1
Varix.....	3	10	6	5	1		1	16	29
DISEASES OF THE RESPIRATORY SYSTEM.....	6	123	87	23	3	11	5	452	581
Inflammation of mucous membrane of larynx—Catarrhal, acute.....								7	7
Bronchitis—									
Catarrhal, acute.....		73	62	7	1	2	1	300	373
Catarrhal, chronic.....	4	3		6	1			89	96

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE RESPIRATORY SYSTEM—Continued.									
Spasmodic asthma								15	15
Hæmorrhage of lung—Hæmoptysis ..		1	1					2	3
Pneumonia.....	1	26	14	2	1	8	2		27
Broncho-pneumonia.....		1				1			1
Pleurisy		17	10	7				37	54
Acute		2		1			1	2	4
Empyema	1						1		1
DISEASES OF THE DIGESTIVE SYSTEM									
Inflammation of the mouth.....	8	160	108	48	8	3	1	505	673
Ulceration of the mouth.....								1	1
Caries of dentine and cementum								2	2
Inflammation of dental periosteum								13	13
Abscess of dental periosteum		2	2					1	3
Inflammation of gums and alveoli								2	2
Suppuration of gums								1	1
Ulceration of gums and alveoli								2	2
Toothache								2	2
Inflammation of the tongue		1	1					7	7
Sore throat.....		6	4	2					1
Inflammation of tonsils—								57	63
Follicular		13	12	1				20	33
Suppuration		19	17	2				3	22
Hypertrophy of tonsils		1	1						1
Inflammation of the pharynx—									
Catarrhal								17	17
Follicular		1	1						1
Stricture of the œsophagus		1			1				1
Inflammation of the stomach—Ca-									
tarrhal	1	23	2	19	1	2		53	77
Hæmorrhage of the stomach		1	1						1
Indigestion.....		6	5	1				152	158
Pyrosis.....								3	3
Gastralgia								1	1
Loss of appetite								2	2
Inflammation of the intestines—									
Enteritis		2	2					1	3
Typhlitis	1	3	3	1				3	7
Colitis		7	5	1		1		5	12
Catarrhal		3	3					3	6
Ulceration of the intestines		1		1					1
Fæcal accumulation		1	1					2	3
Hernia	4	29	25	5	3			64	97
Intestinal dyspepsia.....		1	1						1
Constipation								34	34
Colic								2	2
Diarrhœa		2	1	1				27	29
Inflammation of the rectum		2	1	1					2
Periproctitis—Abscess		2	2					1	3
Ulceration of the anus		1	1					1	2
Fissure of the anus		1	1						1
Fistula in ano	1	10	5	5	1			3	14
Piles—									
Internal		9	7	1	1			5	14
External		1	1					3	4
Mixed		4	1	2	1			9	13
Pruritus ani.....								1	1
Inflammation of the liver, chronic ..	1	2		2			1		3
Hyperæmia of the liver		1	1						1
Hypertrophy of the liver								1	1
Jaundice								1	1
Inflammation of hepatic ducts and gall bladder		1	1						1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE DIGESTIVE SYSTEM—Continued.									
Calculi.....		1		1					1
Perforation of the hepatic ducts—Biliary fistula.....		2		2					2
DISEASES OF THE LYMPHATIC SYSTEM.....									
Inflammation of lymph glands.....	2	27	16	12			1	34	63
Suppuration.....	1	15	7	8			1	26	42
Hypertrophy of lymph glands.....	1	12	9	4				7	20
DISEASES OF THE URINARY SYSTEM.....									
Acute nephritis.....	3	29	10	17		3	2	64	96
Bright's disease—		5	3	1			1		5
Chronic nephritis.....	2	12		10		3	1	5	19
Calculus in ureter.....		1	1						1
Hæmaturia.....		2	1	1				1	3
Lithuria.....								5	5
Inflammation of bladder—									
Acute.....	1	6	4	3				26	33
Subacute.....		1		1					1
Chronic.....		1		1				23	24
Calculus of bladder.....		1	1						1
Irritability of bladder.....								3	3
Incontinence of urine.....				1				1	1
DISEASES OF THE GENERATIVE SYSTEM.....									
Urethritis.....	5	74	40	35	2		2	244	323
Stricture of urethra—organic.....	2	20	6	15	1			53	75
Urethral fistula.....		1		1					1
Abscess of the prostate.....		1	1						1
Hypertrophy of the prostate.....		2		2				1	3
Posthitis.....		1	1						1
Phimosis.....	1	3	3		1			2	6
Paraphimosis.....		1		1					1
Inflammation of the penis—of the glans.....								1	1
Soft chancre.....		31	17	12			2	135	166
Abscess of the scrotum.....		1		1					1
Inflammation of the spermatic cord.....								2	2
Varicocele.....	1	3	3	1				11	15
Hydrocele of tunica vaginalis.....		2	1	1				4	6
Inflammation of the testicle—									
Acute orchitis.....	1	2	3					10	13
Chronic orchitis.....		1		1					1
Epididymitis.....		4	4					10	14
Spermatorrhœa.....		1	1					6	7
Impotence.....								5	5
DISEASES OF THE ORGANS OF LOCOMOTION.....									
Inflammation of the bones—Periostitis.....	3	27	15	9	3	1	2	85	115
Caries.....		1	1					2	3
Inflammation of joints—	1	2	2	1					3
Acute synovitis.....		5	3	1			1	2	7
Chronic synovitis.....		1		1					1
Senile degeneration of cartilage.....	1					1			1
Ankylosis.....	1						1	1	2
Psoas, lumbar, and other abscesses.....		1		1					1
Myalgia—									
Lumbago.....		6	4	1	1			72	78
Stiff neck.....		1			1				1
Inflammation of sheaths of tendons.....		2	1	1				1	3
Ganglion.....								1	1
Inflammation of bursa—									
Acute.....		7	4	3				3	10
Chronic.....					1				1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Local Diseases—Continued.									
DISEASES OF THE ORGANS OF LOCOMOTION—Continued.									
Abscess of bursa		1			1				1
Bunion								1	1
Bursal cyst								1	1
Bursal tumor								1	1
DISEASES OF THE CONNECTIVE TISSUE									
Inflammation	4	28	19	9		1	3	80	112
Abscess	2	6	7				1	23	31
Undue formation of fat	2	22	12	9		1	2	55	79
								2	2
DISEASES OF THE SKIN									
Erythema	6	59	37	23	1		4	316	381
Urticaria								2	2
Eczema		11	6	5				10	10
Impetigo								90	101
Prurigo								6	6
Psoriasis	1			1				1	1
Herpes		1	1					7	8
Zona		1	1					5	6
Dermatitis herpetiformis		1	1					7	8
Acne								1	1
Sycosis								6	6
Seborrhea								7	7
Ulcer	3	24	11	12			4	73	100
Cicatrizes	1			1				2	3
Boil		9	8		1			68	77
Carbuncle	1	7	6	2				1	9
Whitlow		3	3					10	13
Onychia		1		1				6	7
Corn								1	1
Wen		1	1					3	4
Hyperidrosis								2	2
Pruritus								4	4
Lupus		1		1				3	4
Injuries	28	350	238	118	1	7	14	638	1,016
GENERAL INJURIES									
Effects of heat—Burns and scalds	1	20	9	7		1	4	25	46
Effects of chemical irritants and corrosives	1	18	7	7		1	4	25	44
Suffocation		1	1						1
		1	1						1
LOCAL INJURIES									
Contusion of nerves	27	330	229	111	1	6	10	613	970
Contusion of veins		1	1						1
Rupture of veins		1	1						1
Strain of muscles		2	2					8	10
Displacement of muscles								2	2
Frostbite		4	3				1	3	7
Contusion of scalp		3	1	2				2	5
Wound of scalp—									
With injury to the aponeurosis		7	6	1				10	17
With injury to the pericranium		2	1	1				11	13
Fracture of the vault of skull		1	1						1
Fracture of the base of skull		4	1	2		1			4
Concussion of brain		2	1	1					2
Contusion of face		2	1	1				6	8
Wound of face and mouth		13	12			1		15	28
Fracture of facial bones—Lower jaw	1	3	2	2				1	5
Contusion of eyelid		1		1					1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

THE PACIFIC—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office re- Hef.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries—Continued.									
LOCAL INJURIES—Continued.									
Wound of eyelid		1	1					1	2
Subconjunctival hæmorrhage								1	1
Foreign bodies in the conjunctiva or cornea								11	11
Compression of chest		1		1					1
Contusion of chest		7	3	4				23	30
Fracture of ribs	2	10	7	5				9	21
Wound of parietes of chest	1	1	1					1	2
Contusion of back	1	15	10	6				22	38
Sprain of back	2	10	8	4				22	34
Wound of back								4	4
Concussion of cord		1		1					1
Compression of cord		1				1			1
Wound of parietes of abdomen	1	2		2		1		1	4
Contusion of the pelvis		1	1						1
Contusion of testicle								2	2
Contusion of upper extremities		8	4	4				67	75
Sprain of shoulder								7	7
Sprain of elbow								5	5
Sprain of wrist		1	1					11	12
Sprain of hand								1	1
Wound of upper extremities	4	41	34	10	1			195	240
Fracture of clavicle		12	6	6					12
Fracture of humerus		5	1	3		1			5
Fracture of bones of forearm—									
Radius		4	2	2					4
Ulna		3	2	1				2	5
Both bones		4	1	3				2	6
Fracture of carpus, metacarpus, or phalanges		6	3	2			1	6	12
Dislocation of humerus		6	3	3				3	9
Dislocation of radius and ulna		1	1						1
Dislocation of phalanges of thumb								1	1
Dislocation of phalanges of fingers								1	1
Contusion of lower extremities	1	41	29	11			2	61	103
Sprain of hip		1	1					1	2
Sprain of knee	1	7	4	3			1	14	22
Sprain of ankle	6	22	18	9			1	28	56
Sprain of foot		1					1		1
Wound of lower extremities	1	36	31	6				48	85
Wound of joint, lower extremities								1	1
Fracture of femur	3	5	3	3			2		8
Fracture of patella	1	3	2	2					4
Fracture of tibia	1	2	2	1				1	4
Fracture of fibula		5	3	1			1		5
Fracture of tibia and fibula	2	13	9	5		1		2	17
Fracture of bones of foot—									
Of the tarsus		4	3	1					4
Of the metatarsus		1		1					1
Of the phalanges of the toes		1	1						1
Dislocation of femur		1	1						1

QUARANTINE.

TOTAL CASES	6	106	85	22		3	2	79	191
General Diseases	6	84	73	12		3	2	33	123
Smallpox		4	3			1			4
Cowpox		1	1						1

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES
TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

QUARANTINE—Continued.

[illegible]

TABLE VII.—TABULAR STATEMENT, BY DISTRICTS, OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1898—Continued.

QUARANTINE—Continued.

Diseases.	Number of cases.								
	Remaining under treatment from previous year.	Admitted during the year.	Discharged.			Died.	Remaining under treatment at close of year.	Number furnished office relief.	Number treated in hospital and dispensary.
			Recovered.	Improved.	Not improved.				
Injuries		12	5	7				11	23
GENERAL INJURIES.....		7	4	3					7
Effects of heat—Burns and scalds.....		7	4	3					7
LOCAL INJURIES		5	1	4				11	16
Strain of muscles								2	2
Wound of the scalp— With injury to the aponeurosis		2		2				1	3
Wound of face and mouth								1	1
Fracture of facial bones.....		1		1					1
Foreign bodies in the conjunctiva or cornea								1	1
Contusion of neck		1	1						1
Wound of parietes of abdomen								1	1
Wound of the upper extremities.....								1	1
Fracture of the humerus.....								1	1
Sprain of the ankle								1	1
Wound of the lower extremities		1		1				2	3

TABLE VIII.—TABULATED STATEMENT, BY DISTRICTS, OF CAUSES OF MORTALITY AMONG PATIENTS OF THE SERVICE DURING THE YEAR ENDED JUNE 30, 1898.

Causes of death.	Total.	Districts.								
		North Atlantic.	Middle Atlantic.	South Atlantic.	The Gulf.	The Ohio.	The Mississippi.	The Great Lakes.	The Pacific.	Quarantine.
Total Deaths from all Causes	381	30	62	62	45	25	35	50	69	3
FROM DISEASES.....	348	27	61	56	39	24	31	45	62	3
FROM INJURIES.....	33	3	1	6	6	1	4	5	7	
General Diseases	173	13	36	29	18	11	17	22	24	3
Smallpox	1									1
Measles	1								1	
Influenza	3			1				1		
Cerebro-spinal fever.....	2		1						2	
Enteric fever	19	3	4	2	2			6	2	
Choleraic diarrhoea	1							1		
Dysentery	4				2	1				1
Yellow fever	2				1					1
Malarial fever—										
Intermittent.....	6		3	1			1	1		
Remittent	7			3	2	1	1			
Phagedæna	1							1		
Tetanus	1				1					
Tubercle	92	7	21	21	6	7	11	8	11	
Leprosy	1								1	
Syphilis, secondary	8	1	2		2		2	1		
Lead colic	2		1			1				
Alcoholism	4		1		1		1	1		

TABLE VIII.—TABULATED STATEMENT, BY DISTRICTS, OF CAUSES OF MORTALITY AMONG PATIENTS OF THE SERVICE, ETC.—Continued.

Causes of death.	Total.	Districts.								
		North Atlantic.	Middle Atlantic.	South Atlantic.	The Gulf.	The Ohio.	The Mississippi.	The Great Lakes.	The Pacific.	Quarantine.
General Diseases—Continued.										
Rhenmatic fever.....	2	1	1							
Rheumatism.....	5		1			1	1	1		1
Sarcoma.....	2									2
Carcinoma.....	7		1	1	1			1		3
Diabetes mellitus.....	1									1
Debility.....	1	1								
Local Diseases.....	175	14	25	27	21	13	14	23	38	
DISEASES OF THE NERVOUS SYSTEM.....	25	2	3	8	4	2	1	1	4	
Multiple neuritis.....	1				1					
Diffuse inflammation—Of spinal cord.....	1			1						
Degeneration—										
Of lateral columns.....	3	1					1		1	
Of posterior columns.....	1		1							
Inflammation—Of brain.....	1								1	
Hemorrhage.....	3			1					2	
Hyperæmia.....	1				1					
Apoplexy.....	1				1					
Hemiplegia.....	3	1		1				1		
Incomplete paralysis.....	1					1				
Epilepsy.....	2		2							
Vertigo.....	1			1						
Neuralgia.....	1				1					
Mania, acute.....	1			1						
Melancholia.....	1			1						
Dementia.....	3			2		1				
DISEASES OF THE EAR.....	1									1
Inflammation of the middle ear—Suppurative.....	1									1
DISEASES OF THE CIRCULATORY SYSTEM.....	49	3	6	3	6	4	2	11	14	
Valvular diseases:										
Aortic.....	18	1	2	2	3	2	2	3	3	
Mitral.....	21	2	3	1	3	1		6	5	
Fatty degeneration of heart.....	1		1							
Dilatation of heart.....	1								1	
Aneurism of arteries.....	7					1		1	5	
Varix.....	1							1		
DISEASES OF THE RESPIRATORY SYSTEM.....	43	2	7	6	5	3	6	3	11	
Bronchitis:										
Catarrhal, acute.....	5	1		1		1			2	
Catarrhal, chronic.....	2				1	1				
Congestion of lung.....	2		1	1						
Pneumonia.....	28		5	4	2	1	5	3	8	
Broncho-pneumonia.....	6	1	1		2		1		1	
DISEASES OF THE DIGESTIVE SYSTEM.....	28	2	4	5	3	4	4	3	3	
Inflammation of stomach—Catarrhal.....	4			1			1		2	
Ulceration of the stomach—Superficial.....	1	1								
Inflammation of the intestines:										
Typhlitis.....	4		1	1		1		1		
Colitis.....	1								1	
Catarrhal.....	1									
Hernia.....	2		1				1			
Stricture of the intestines.....	1			1						
Intestinal dyspepsia.....	1									
Diarrhœa.....	1				1					
Ulceration of the rectum.....	1									
Fistula in ano.....	1	1						1		
Inflammation of the liver—										
Acute.....	2		1		1					
Chronic.....	3					1	2			
Degeneration of the liver—Lardaceous.....	1			1						
Inflammation of the hepatic ducts and gall bladder.....	2		1		1					
Biliary colic.....	1			1						
Dropsy.....	1					1				

TABLE VIII.—TABULATED STATEMENT, BY DISTRICTS, OF CAUSES OF MORTALITY AMONG PATIENTS OF THE SERVICE, ETC.—Continued.

Causes of death	Total.	Districts.								
		North Atlantic.	Middle Atlantic.	South Atlantic.	The Gulf.	The Ohio.	The Mississippi.	The Great Lakes.	The Pacific.	Quarantine.
Local Diseases—Continued.										
DISEASES OF THE URINARY SYSTEM	20	4	4	5	1			3	3	
Acute nephritis.....	6	2						1	3	
Bright's disease.....	14	2	4	5	1			2		
DISEASES OF THE GENERATIVE SYSTEM.....	6	1	1		2		2			
Stricture of urethra—Organic.....	4	1			1		2			
Recto-urethral fistula.....	1		1							
Soft chancre.....	1				1					
DISEASES OF THE ORGANS OF LOCOMOTION.....	2					1			1	
Hypertrophy of the bones.....	1					1				
Senile degeneration of cartilage.....	1								1	
DISEASES OF THE CONNECTIVE TISSUE.....	1								1	
Abscess.....	1								1	
Injuries.....	33	3	1	6	6	1	4	5	7	
GENERAL INJURIES.....	15			4	2	1	3	4	1	
Effects of heat—										
Burns and scalds.....	11			4			3	3	1	
Heat stroke.....	2				2					
Multiple injury.....	1							1		
Shock.....	1					1				
LOCAL INJURIES.....	18	3	1	2	4		1	1	6	
Rupture of the arteries.....	1	1								
Fracture of the base of the skull.....	1	1								
Concussion of brain.....	2							1	1	
Wound of face and mouth.....	1								1	
Wound of neck.....	2			1			1			
Contusion of chest.....	1			1						
Fracture of the ribs.....	2		1		1					
Gunshot wound of chest.....	1				1					
Compression of cord.....	1				1				1	
Wound of the parietes of the abdomen.....	2				1				1	
Fracture of the humerus.....	1								1	
Wound of joint of lower extremities.....	1				1					
Fracture of tibia and fibula.....	2	1							1	

TABLE IX.—SURGICAL OPERATIONS. FISCAL YEAR 1898.

Operations.	Number of cases.	Remarks.
Total Number of Operations	903	
OPERATIONS ON TUMORS	24	
Removal by excision:		
For lipoma.....	4	
For fibroma.....	3	
For chondroma.....	2	
For osteoma.....	1	
For neuroma.....	1	Of finger stump, amputated
For papilloma.....	5	
For sarcoma.....	5	Three deaths.
For carcinoma.....	3	One unsuccessful.
OPERATIONS ON CYSTS	12	
For sebaceous cyst.....	11	Removed.
For blood cyst.....	1	Incised.
EVACUATION OF ABSCESSES	95	
By aspiration—psoas abscess.....	1	

TABLE IX.—SURGICAL OPERATIONS, FISCAL YEAR 1898—Continued.

Operations.	Number of cases.	Remarks.
EVACUATION OF ABSCESSES—Continued.		
By free incision and drainage:		
Abscess of dental periostium	1	
Abscess of face	4	
Abscess of external ear	1	
Abscess of neck	8	
Abscess of axilla	8	
Abscess of arm	12	
Abscess of hand	13	
Abscess of chest	1	
Abscess of back	2	
Abscess of abdomen	1	
Abscess of hip	1	
Abscess of buttock	1	
Abscess of penis	3	
Abscess of rectum	6	
Abscess of thigh	5	
Abscess of leg	5	
Abscess of knee	2	
Abscess of foot	2	
Abscess of bursa patellæ	1	
Abscess, perinephritic	3	
Abscess, ischio rectal	4	
Abscess, urethral	5	
Abscess, perineal	2	
Abscess of epididymis	1	
Abscess of scrotum	1	
Tubercular abscess	1	Death.
REMOVAL OF FOREIGN BODIES	5	
Splinter in hand	1	Removed.
Pistol bullet in hand	1	Do.
Pistol bullet in shoulder	1	Do.
Gunshot wound of thigh	2	Shot removed.
OPERATIONS ON THE VEINS	27	
Phlebotomy—radial vein	2	
Obliteration of varices—of leg	19	1 for aneurysm of the aorta and 1 during chronic nephritis.
Excision of varices:		10 by Schede's method; 2 by Phelps's method; 7 by ligation (1 death).
Of leg	4	
Of thigh	2	
OPERATIONS ON THE LYMPHATIC ORGANS	152	
Removal of lymphatic glands:		
Of mouth	1	Submaxillary and sublingual glands removed.
Of neck	9	5 tubercular.
Of axilla	1	
Of groin	61	26 operations were for enlargement and inflammation without suppuration; the remainder had suppurated.
For incision and evacuation of inflamed and suppurating glands of groin	80	24 of these operations consisted in incising and injecting iodoform after evacuation of cavity. For inflammation, 33; for suppuration, 47.
OPERATIONS ON NERVES	4	
Neurectomy—anterior and posterior tibial nerves	1	For neuralgia of stump, lower extremity.
Nerve stretching—greater sciatic nerve	2	1 by means of an incision and the other without.
External popliteal nerve	1	Incision and release of nerve from being bound down by an old cicatrix to lower portion of the popliteal space.
OPERATIONS ON THE SKIN AND SUBCUTANEOUS TISSUES	13	
For chronic ulcer:		
Skin of face	1	Curetted.
Skin of hand	1	Skin grafting—Thiersch.
Skin of leg	6	2 curetted and 4 skin grafting—Thiersch.
Skin grafting—Thiersch's method	5	3 for burns and 2 for frostbite.
OPERATIONS ON BONES	55	
Incision of periosteum—of tibia	2	For periostitis.
Osteotomy—linear	1	For necrosis of tibia.

TABLE IX.—SURGICAL OPERATIONS, FISCAL YEAR 1898—Continued.

Operations.	Number of cases.	Remarks.
OPERATIONS ON BONES—Continued.		
Excision:		
Of inferior maxilla (partial)	1	For necrosis, 1 death.
Of sternum (partial)	1	Do.
Of ileum (partial)	2	Do.
Of head of metatarsals	3	2 for Hallux valgus and 1 for frost-bite.
Removal of fragments of bone:		
Curetting and scraping—		
Ribs and clavicle	2	For necrosis of bone.
Superior maxilla	1	Do.
Spine of scapula	1	Do.
Femur	2	Do.
Sacrum	1	For necrosis of bone; death.
Tibia	3	For necrosis of bone.
Bones of hand	1	Do.
Bones of foot	1	Do.
Head of tibia	1	For necrosis of bone; sequestrum removed.
For ununited fracture—of tibia	1	Incision, curettement, and rubbing ends of bone together.
Refraction of bone—femur	1	With excision for sequestra.
Operations on fractured bones:		
For fracture inferior maxilla	2	Reduction, splint.
Clavicle	3	Do.
Humerus	3	2 simple, 1 compound.
Ulna	2	Reduction, splint.
Radius (head)	2	Gunshot wounds.
Phalanges	4	Compound comminuted, result of hand being crushed; amputation of terminal phalanges.
Femur	3	1 compound; removal of fragments of bone.
Patella	2	1 muscular violence; wired.
Tibia and fibula	3	1 developed osteomyelitis.
Tibia	3	Reduction, splint; 1 compound comminuted—resected and wired.
Fibula	1	Reduction.
Astragalus	1	With dislocation—head of bone removed.
Metatarsal bone	1	Reduction.
OPERATIONS ON JOINTS	33	
Reduction of dislocation:		
Of shoulder	12	1 for old dislocation.
Of radius and ulna	1	Recent.
Operation for ankylosis:		
Of hip joint	1	Forcible flexion.
Of elbow joint	1	Do.
Of phalangeal joints	2	Do.
Aspiration	9	All knee joint.
Incision:		
Of elbow joint	1	For cyst of elbow joint.
Of knee joint (1 with drainage)	2	1 for suppurative; 1 for inflamed bursa.
Excision—of hip joint (complete)	2	1 for tubercular disease; 1 for ankylosis.
Erasion—of wrist joint	1	For tubercular disease.
Removal of loose bodies—of elbow joint	1	Loose cartilage.
OPERATIONS ON MUSCLES, TENDONS, AND FASCIA	1	
Union of divided tendon	1	For rupture.
AMPUTATIONS	53	
Amputations for injury:		
Of thigh	2	1 through upper third for compound fracture, with osteomyelitis, and the other through the middle third, for multiple injury.
Of arm	2	1 at the shoulder joint, for lacerated wound, and 1 through the middle third.
Of leg	3	1 through upper third for contused wound and other through the middle third for compound dislocation of the foot.
Of forearm	2	For compound comminuted fracture.
Of foot	3	1 mediotarsal joint for compound comminuted fracture, and 1 through ankle joint for avulsion of foot, and 1 for lacerated wound.
Of fingers	9	
Of toes	3	

TABLE IX.—SURGICAL OPERATIONS, FISCAL YEAR 1898—Continued.

Operations.	Number of cases.	Remarks.
AMPUTATIONS—Continued.		
Amputations for disease:		
Of thigh.....	2	1 secondary, for gangrene of leg—through the middle third, transfixion, anterior and posterior flap; death; 1 for inflammation of lymphatics of leg, through lower third—circular operation.
Of leg.....	2	1 through upper third, lateral skin flap, circular division of muscles for gangrene of foot; 1 modified circular, for gangrene of foot.
Of forearm.....	1	Lower fourth, for tuberculosis.
Of fingers.....	21	12 for necrosis, 2 for inflammation, 3 for contracted flexor tendons, 2 for ankylosis of joint, and 2 for gangrene.
Of toes.....	3	2 for frostbite, 1 for contracted tendon.
OPERATIONS ON THE SKULL AND BRAIN.....		
Trephining and removing portions of the skull	7	
For depressed bone.....	3	1 death; fracture of base of skull.
For epilepsy.....	1	
Opening of the mastoid cells.....	3	For suppuration, removal of carious bone; 1 death.
OPERATIONS ON THE FACE, NASAL CAVITIES, AND MOUTH.....		
Removal of nasal polypus through the natural passage.....	6	
For stricture of nasal duct.....	1	By use of snare.
Removal of uvula.....	1	Duct split up and probed.
Removal of tonsils.....	3	For elongation.
OPERATIONS ON THE EYE AND ITS APPENDAGES.....		
Operations on the eyelids:	20	
For ectropion.....	1	Excision of portion.
For symblepharon.....	1	
Operations on the other appendages of the eye:		
For strabismus.....	5	Tentotomy.
For pterygium.....	6	Excision and dissection.
Operations on the eyeball:		
Iridectomy.....	1	
Paracentesis.....	1	Iritis.
Extraction of lens.....	2	For cataract.
Excision of eyeball.....	3	1 for calcification of vitreous humor, 1 for lacerated wound of eye—panophthalmitis.
OPERATIONS ON THE EAR.....		
Trephining of mastoid process.....	1	
	1	Curettement; chronic inflammation.
OPERATIONS ON THE THORAX AND BREAST.....		
Paracentesis of pleural cavity.....	23	
	19	1 death. For chronic pleurisy, with effusion, 16; and for acute pleurisy, with effusion, 3.
Incision and drainage of pleural cavity, with excision of part of a rib or ribs.....	4	For empyema. 1 death.
OPERATIONS ON THE ABDOMEN.....		
Paracentesis of abdomen.....	146	
Abdominal section.....	57	
	8	1 for gunshot wound; 1 for suspected cholelithiasis—death from rupture of a varicose branch of the superior mesenteric vein; 2 for punctured wound, with omental hernia; 1 for hepatic calculi (cholecystotomy); 1 for acute local peritonitis; 1 for acute general peritonitis (death), and 1 for chronic general peritonitis.
Gastro-enterostomy.....	1	For carcinoma of pylorus.
Excision of portions of intestine—for excision of the vermiform appendix.....	12	3 deaths.
Operations for hernia:		
For radical cure:		
Oblique inguinal.....	60	1 death. Bassini's method, 21; modified Bassini's, 14; Andrew's method, 19; Halstead's method, 3; Marey's method, 2; Kocher's method, 1.

TABLE IX.—SURGICAL OPERATIONS. FISCAL YEAR 1898—Continued.

Operations.	Number of cases.	Remarks.
OPERATIONS ON THE ABDOMEN—Continued.		
Operations for hernia—Continued.		
For radical cure—Continued.		
Direct inguinal	4	All modified Bassini's method.
Femoral hernia	2	Bassini.
Ventral hernia	1	Do.
For abscess of the liver	1	Free incision and drainage.
OPERATIONS ON THE RECTUM AND ANUS.		
For fistula in ano	56	
For anal fissure	29	Incision, curetting.
For stricture of the rectum	1	Cautery.
For hemorrhoids:		Incision.
By injection	1	
By ligation	14	
By excision	6	
By cautery	4	
OPERATIONS ON THE BLADDER AND URETHRA.		
Cystotomy:	56	
Supra pubic	1	For removal of nonmalignant new growth of bladder.
Median perineal	1	Do.
Removal of vesical calculi—By litholapaxy	1	
Plastic operations upon the urethra	3	For urethral fistula (external urethrotomy).
For stricture of urethra:		
By gradual dilatation	20	
By forcible dilatation	13	
By internal urethrotomy	10	
By external urethrotomy or by perineal section.	7	2 perineal sections.
OPERATIONS ON THE MALE GENERATIVE ORGANS.		
For phimosis	111	
	62	10 congenital; circumcision, 58; dorsal incision, 4.
For paraphimosis	5	Circumcision.
Amputation of the penis	1	For carcinoma.
For varicocele	17	Ligation and excision.
For hydrocele:		
Tapping	11	
Tapping, with injection	9	
Excision of parietal part of sac	2	
Castration	5	1 for carcinoma of scrotum and testis, 1 for ulceration, 1 for sarcoma, 1 for tubercle, and 1 for hypertrophy of prostate.
OPERATIONS ON THE FEMALE GENERATIVE ORGANS.		
Scraping of uterine cavity	4	
	3	For catarrhal inflammation of the uterus.
Repair of lacerated cervix uteri	1	For laceration.

TABLE X.—RATIO OF DEATHS FROM SPECIFIC CAUSES.

Deaths from—	Per 100 from all causes.	Deaths from—	Per 100 from all causes.
General diseases	45.40	Diseases of the digestive system	7.35
Diseases of the nervous system	6.56	Diseases of the urinary system	5.25
Diseases of the circulatory system	12.86	Injuries	8.66
Diseases of the respiratory system	11.29	From all other causes	2.63

TABLE XI.—RATIO OF DEATHS IN EACH DISTRICT.

Districts.	Per 100 patients treated in hospital.	Districts.	Per 100 patients treated in hospital.
North Atlantic	2.55	The Mississippi	3.18
Middle Atlantic	3.92	The Great Lakes	2.34
South Atlantic	3.49	The Pacific	3.43
The Gulf	2.94	The quarantine stations	2.68
The Ohio	2.73		

TABLE XII.—COMPARATIVE EXHIBIT—MORTALITY PER 100 PATIENTS TREATED IN HOSPITAL, BY DISTRICTS, 1889-1898.

Districts.	General average.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
North Atlantic.....	2.72	3.25	2.65	2.50	2.62	2.46	2.36	3.09	2.73	2.95	2.55
Middle Atlantic.....	4.00	3.92	4.66	3.77	3.44	3.69	4.17	4.56	4.12	3.75	3.92
South Atlantic.....	3.33	3.55	3.64	2.56	2.71	3.37	4.00	3.56	3.55	2.83	3.49
The Gulf.....	3.18	3.08	3.40	3.88	3.63	3.29	2.38	2.98	2.90	3.33	2.94
The Ohio.....	2.73	3.52	2.26	2.54	1.53	3.01	2.51	3.23	3.24	2.78	2.73
The Mississippi.....	3.31	3.52	3.04	3.67	3.37	3.64	3.99	2.53	3.20	2.92	3.18
The Great Lakes.....	2.75	2.93	2.63	2.44	4.11	2.76	2.61	2.54	2.26	2.86	2.34
The Pacific.....	4.13	4.22	4.42	4.43	3.83	3.73	3.76	4.38	4.70	4.40	3.43
The quarantine stations.....	4.13	-----	-----	-----	-----	-----	-----	-----	4.76	4.94	2.68

TABLE XIII.—COMPARATIVE EXHIBIT—RATIO OF DEATHS FROM SPECIFIC CAUSES, 1889-1898.

Deaths from—	General average.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
General diseases.....	47.65	45.47	50.20	52.66	43.42	47.70	47.70	43.94	50.70	48.99	45.45
Diseases of the—											
Nervous system.....	5.14	5.69	4.06	3.69	6.05	4.81	5.58	4.81	4.65	5.56	6.56
Circulatory system.....	9.22	7.58	5.81	9.84	9.60	8.99	5.58	10.76	11.39	9.85	12.86
Respiratory system.....	14.74	17.26	19.10	15.16	15.85	13.38	16.51	16.24	12.23	10.35	11.29
Digestive system.....	7.54	7.37	6.39	5.33	7.30	7.11	8.48	10.53	6.51	9.09	7.35
Urinary system.....	5.26	4.63	4.67	4.71	4.80	6.48	5.35	6.17	3.49	7.07	5.25
Injuries.....	6.61	8.00	5.81	5.33	7.72	8.99	5.58	3.43	6.28	6.31	8.66
From all other causes.....	3.84	4.00	3.65	3.28	5.26	2.54	5.57	4.12	4.65	2.78	2.63

TABLE XIV.—COMPARATIVE EXHIBIT—AVERAGE DURATION OF TREATMENT IN HOSPITAL IN EACH DISTRICT, 1889-1898.

Districts.	General average.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
North Atlantic.....	28.46	30.05	29.21	29.68	24.37	24.12	26.14	29.97	31.07	26.93	33.11
Middle Atlantic.....	28.18	26.92	26.32	26.81	26.87	26.29	24.60	34.21	29.68	30.39	29.75
South Atlantic.....	28.01	27.91	28.27	26.19	26.26	29.23	29.48	29.80	26.83	26.80	29.37
The Gulf.....	22.37	24.55	23.21	21.07	21.97	22.33	22.13	22.46	22.24	22.41	21.35
The Ohio.....	23.85	22.52	24.52	24.92	23.81	23.37	22.80	25.18	25.43	22.20	23.83
The Mississippi.....	20.92	22.60	20.88	22.61	20.59	19.84	21.51	22.92	20.74	19.00	18.57
The Great Lakes.....	27.91	29.69	30.82	27.09	27.82	27.07	28.32	28.34	28.25	26.27	25.45
The Pacific.....	36.23	31.12	33.68	32.68	36.92	40.27	43.57	40.66	38.81	36.20	28.41
The quarantine stations.....	12.66	-----	-----	-----	-----	-----	-----	19.97	10.00	11.69	9.00

TABLE XV.—NATIVITIES OF PATIENTS TREATED IN UNITED STATES MARINE HOSPITALS DURING THE FISCAL YEAR ENDED JUNE 30, 1898.

Countries.	Number.	Countries.	Number.
Total	11,914	India	5
Africa	10	Ireland	625
Australia	25	Italy	33
Azores Islands	5	Japan	22
Bavaria	112	Mexico	15
Belgium	73	New Zealand	18
Brazil	59	Norway	315
Canada	250	Peru	34
Chile	75	Portugal	47
China	11	Prince Edwards Island	30
Denmark	421	Russia	194
England	245	Scandinavia	2
Finland	100	Scotland	301
France	33	Spain	66
Germany	651	Sweden	684
Greece	5	Switzerland	120
Holland	30	United States of America	7,053
Hungary	25	United States of Colombia	23
Iceland	7	West Indies	110
		Unknown	80

PUBLIC HEALTH SERVICE.

PUBLIC HEALTH SERVICE.

CHOLERA.

CHOLERA DURING THE YEAR 1898.

In my last annual report (dated November 1, 1897), I stated that cholera had entirely disappeared from Russia, where it had lingered in the outlying districts since the great European epidemic in 1893.

At that time last year it was existent only in India (the cities of Bombay, Calcutta, and Madras having the greatest number of deaths therefrom), in Singapore, and in Japan.

No other localities have been invaded this year, and the statistical table herewith submitted, showing the localities where cholera has been reported, is geographically similar to that accompanying my last annual report.

Five cases and three deaths were reported to have occurred in Hongkong among the native population during the last week in April, but since these cases there have been no others.

The following number of deaths from cholera in the cities of Calcutta, Bombay, and Madras are not excessive, considering the usual number of deaths from cholera occurring in these Indian cities, the endemic character of cholera in India, and the habits of the Hindoos.

In Calcutta, from November 1, 1897, to the last report received, dated August 27, there have been 574 deaths. In Bombay, during approximately the same period, there have been 91 deaths, while in Madras, where cholera had been prevailing to a limited extent during the early months of the present year, it suddenly became epidemic, and was so reported on August 11, 1898, by cable. Up to that date there had been, since November 1, 1897, 291 fatal cases of cholera in the city, of which number 79 occurred between July 9 and July 29, 1898.

Since that date to the date of the last report received—September 2, 1898—there were 178 deaths from cholera in Madras.

In the Empire of Japan cholera has existed sporadically since late in the spring of the present year. At this date, however, there are no cases being reported from any locality other than Tokyo Fu, where the total number of cases to date has only been eleven.

In all, nine localities in the Empire have been infected with cholera, but there have been in the aggregate but few cases and deaths. The

figures of the mortality and morbidity from cholera in Japan fade into utter insignificance when viewed in comparison with the mortality from dysentery during its annual summer epidemic. This year there were between thirty and forty localities infected with this disease, and during the seven weeks ending August 16, 1898, there were 9,519 cases and 1,532 deaths from dysentery alone.

One case of cholera has been reported during the year at Singapore, Straits Settlements, but no further cases have occurred.

The following table of deaths from cholera and localities where they occurred has been prepared in the division of sanitary reports and statistics of this Bureau:

Cholera as reported to the Supervising Surgeon-General United States Marine-Hospital Service. November 1, 1897, to October 1, 1898.

Places.	Date.	Cases.	Deaths.	Remarks.
China:				
Hongkong	Apr. 24-Apr. 30..	5	3	
India:				
Bombay	Sept. 29-Nov. 30..		129	
	Dec. 1-Mar. 1 ..		55	
	Mar. 2-Mar. 29 ..		11	
	Mar. 30-May 24 ..		16	
	June 1-June 7 ..		1	
	June 20-June 28 ..		2	
	July 5-July 12 ..		3	
	July 19-July 26 ..		4	
	July 26-Aug. 30 ..		14	
Calcutta	Oct. 31-Dec. 4 ..		71	
	Dec. 5-Jan. 1 ..		31	
	Jan. 2-Jan. 29 ..		28	
	Jan. 30-Feb. 26 ..		82	
	Feb. 27-Mar. 26 ..		95	
	Mar. 27-June 11 ..		271	
	June 25-July 16 ..		17	
	July 16-Aug. 27 ..		22	
Madras	Oct. 30-Nov. 12 ..		12	
	Dec. 4-Dec. 31 ..		11	
	Jan. 1-Jan. 28 ..		45	
	Jan. 29-June 10 ..		43	
	May 28-June 3 ..		1	
	July 9-July 22 ..		43	
	July 22-July 29 ..		36	
	Aug. 11 ..			Cholera reported epidemic.
Singapore	July 29-Sept. 2 ..		178	
	Nov. 1-Nov. 30 ..		1	
	Dec. 1-Dec. 31 ..		1	
	Mar. 1-Mar. 31 ..		1	
Japan:				
Fukuoka Ken	June 27-July 27 ..	1		
Hiogo	May 19-June 5 ..	1	1	
Ishikawa Ken	June 27-July 27 ..	3	2	
Kanagawa Ken	Mar. 24-June 26 ..	15	7	
Okayama	Apr. 29-May 19 ..	1		
Osaka and Hiogo	Mar. 26-June 11 ..	4	2	
	May 21-May 28 ..	1		
Tokyo Fu	Apr. 11-June 15 ..	14	4	
	June 27-Aug. 16 ..	23	15	
Yamagata Ken	June 27-July 27 ..	1		
Yokohama	Apr. 15-Apr. 29 ..		1	
Straits Settlements:				
Singapore	June 1-June 30 ..		1	

YELLOW FEVER.

UNITED STATES.

As mentioned in my last annual report, at the time of its issue an epidemic of yellow fever was existent in some of the Southern States which border on the Gulf of Mexico.

This epidemic, which was described in detail in my annual report for 1897, was first recognized as yellow fever at Ocean Springs, Miss., on September 8, 1897, and from that time the disease extended until 9 States had been invaded and upward of 42 localities had cases of yellow fever, there being in all a total of 4,325 reported cases and a total of 484 deaths. The fever was existent in some places as late as December 25, and a few sporadic cases appeared during the winter in Mississippi.

ORIGIN OF THE EPIDEMIC OF YELLOW FEVER IN THE SOUTH DURING THE FALL OF 1897.

Every yellow fever epidemic of recent years has been the storm center of criminations and recriminations respecting the responsibility for its entrance into the country or its subsequent spread. The epidemic of 1897 was no exception to the rule, and immediately upon the first reports of its outbreak in Ocean Springs, Miss., there began a more or less concerted effort to lay the onus of admission on the national quarantine station at Ship Island. To prove it on Ship Island would not only relieve State and local quarantines from all suspicion, but would be gratifying to those who had failed to substitute a State station there for a Government one, and also gratifying to those officials who resented the surveillance over all quarantine required by the act of Congress of February 15, 1893, in the enforcement of which act the Marine-Hospital Service had compelled compliance with the national law. Others, also, who were opposed to the Service, fomented and assisted in the spread in various publications of these false statements and rumors, so that a false impression was created in the minds of many not specially familiar with the subject. The feeling aroused was so strong that upon the assembling of the Mississippi State legislature the governor of the State made special mention of it in his message, and appointed a committee to investigate. A resolution of like effect was introduced in the United

States Senate, and in accordance therewith a subcommittee of the Committee on Public Health and Quarantine was also appointed to investigate. The reports of these committees, appended herewith, completely exonerated the station and the Service. In the meantime I addressed the following letter to yourself, showing the source of the attacks and their utter lack of foundation. This letter was widely published in the daily press.

REFUTATION OF CHARGES AGAINST THE UNITED STATES QUARANTINE STATION
(GULF QUARANTINE) AT SHIP ISLAND, MISSISSIPPI.

[Letter to Secretary of the Treasury.]

WASHINGTON, D. C., *January 29, 1898.*

SIR: I have the honor to submit the following statement with regard to the Ship Island Quarantine, concerning which there has been considerable discussion during the past four or five months in the public press and elsewhere. So many false statements concerning this station have been made, with the evident intent of reflecting on the Marine-Hospital Service, that it seems appropriate to make this official statement:

The charges that have been persistently made and reiterated in the press are, first, that Ship Island, Mississippi, is dangerously near the coast, being only 5 miles therefrom, with free communication between the quarantine and the settlements on the coast; second, that the station was moved from there by act of Congress to Chandeleur Island, and after the destruction of that island by the storm of 1893 I illegally reestablished the station on Ship Island, and third, that by reason of its proximity, and through carelessness and faulty administration, yellow fever was introduced into Mississippi last fall through this station.

An examination of the coast charts will show that Ship Island is 12 miles from the nearest point on the shore. It is an uninhabited island, 9 miles long, with the quarantine station near the eastern end and the shipping harbor at the western end. With the exception that on a clear day the shore lines and the vessels in the shipping harbor may be seen, the station is as much isolated as if it were in the desert of Sahara. A quarantine station is as necessary for the convenience of commerce as it is for the safety of the people. There is absolutely no place for the location of a quarantine off the coast of Mississippi to which greater objections can not be made than are made to Ship Island. If a distance of 12 miles from the coast is an insuperable objection, then the quarantine stations at San Francisco and San Diego, Cal.; Galveston and Sabine Pass, Tex.; Mobile, Ala.; Key West, Pensacola, and Fernandina, Fla.; Brunswick and South Atlantic quarantine, Georgia; Charleston, S. C.; Cape Fear quarantine, North Carolina, and New York quarantine all would have to be moved, for they are all nearer to the coast or to populated districts than is Ship Island. This island was originally selected as a quarantine site by the National Board of Health in 1879. The first steps looking to the removal of the quarantine were taken immediately after the National Board of Health went out of existence in 1883. Captain Lay, of the Revenue-Cutter Service, and Surgeon Murray, of the Marine-Hospital Service, were directed to visit the other islands in the Gulf, and reported, under date of December 19, 1883, that Ship Island was the best located and the only island that possessed the necessary advantages for a quarantine. Nevertheless, in 1888 various influences brought about the act of Congress authorizing the removal of the station to some other island. This act of Congress gave authority, but was not mandatory in its language. A board was appointed March 10, 1888, to select a site for a new quarantine station, and though their orders required them to recommend some other site than Ship Island, the board went out of their way,

in the fourth paragraph of their report, inserted at the suggestion of Dr. Wilkinson, of Louisiana, to state as follows:

"There is no evidence to warrant the belief that the presence of the national quarantine station on Ship Island is a real source of danger to the inhabitants of the Gulf coast, but all testimony points absolutely to the fact that the absence of an efficient quarantine service at that place will afford a probable inlet to contagious diseases into that vicinity."

This report was signed by Surg. W. H. H. Hutton, of the Marine-Hospital Service; Capt. J. H. Parker, of the United States Revenue-Cutter Service; Surg. H. R. Carter, of the Marine-Hospital Service; Dr. J. W. Mabin, of Biloxi, who represented Mississippi, and Dr. C. P. Wilkinson, of the Louisiana board of health. The board reported that Chandeleur Island afforded the "next best" location, and accordingly the station was removed there in 1889, and, all told, about \$85,000 was expended in its establishment.

Immediately thereafter the State of Mississippi established a quarantine at the abandoned site, performed active work there inspecting and disinfecting vessels, charging the customary fees therefor, and continued to do so with some intermission until 1894, when the United States establishment was replaced on Ship Island.

Commenting on the exposed position of Chandeleur, Surgeon Murray narrates that while he was in command of the station, for a period of four months and a half, five vessels got aground, two of which became total wrecks, their crews being with difficulty saved. I personally inspected Chandeleur station in 1890, and quote as follows from the annual report for 1891: "Chandeleur Island is 34 miles in length, running north and south, and extremely narrow, in many places being hardly more than a stone's throw in width. It is little else than a sand reef, with slight elevation above the waters of the Gulf of Mexico. The buildings are in the marshes, on piles. One corner of the surgeon's residence rests on dry land, about 30 by 100 feet in area, the only dry land on the premises." It is 26 miles out at sea, practically in midgulf, and presents all the conditions, including disaster, which furnished the theme for Cable's story of the Lost Island.

Surgeon Carter, while in command of the station, informed me personally that he had learned that this island was subject to periodic overflow by tidal waves, and as had been predicted, in October of 1893 a tremendous storm and tidal wave swept over it, carried the hospital out to sea, and drowned a hospital steward, two attendants, and two patients. It destroyed an expensive pier, on which was located the disinfecting machinery of the station, and not a vestige of the machinery has ever been recovered. It carried the steamer attached to the station high on to a sandspit, and it cost \$3,000 to get her into water again. It injured the light-house to such an extent that the Light-House Establishment has been obliged to erect a new light-house. The medical officer in command, Dr. Guiteras, was for an hour in water up to his chest, holding on to the long grass, and barely escaped with his life. It still being the active quarantine season, and fearful that infection might be admitted following the destruction of the quarantine, Dr. Guiteras landed on Ship Island and began at once the inspection of vessels at that point. He was ordered to continue this inspection, but the full function of this station was not exercised until the establishment had been authorized by law. There was no protest at this time against the reestablishment of the station on Ship Island, and, as will be seen from the annual report of the Marine-Hospital Service for 1893, page 12, I gave a full account of the circumstances and stated that some Congressional action would be required to legalize the establishment of a permanent station on that island, and in the appropriation bill approved August 18, 1894, the transfer was legalized. To show that there was no protest against the reestablishment of the station, I have only to refer to a petition signed by pilots, masters of vessels, and physicians connected with the Mississippi

State board of health urging the reestablishment of the station on Petit Bois Island, an island still nearer to the coast than Ship Island, but more convenient to the city of Pascagoula, yet not so well adapted for a quarantine site, and before obtaining Congressional action above referred to I had the chain of islands along the coast again examined by a senior officer of the Marine-Hospital Service and a captain of the Revenue-Cutter Service, with the result that no superior place to Ship Island could be found.

A full statement of the fact was made by myself in a letter to the Secretary of the Treasury dated June 16, 1894, and on the same date the then Secretary of the Treasury forwarded my letter to the chairman of the Committee on Appropriations in the Senate, calling attention to the letter and asking for appropriation for a small hospital, ballast scows, and other items necessary for the station on Ship Island. As a matter of interest I have caused an examination to be made of Chandeleur Island during last month and have a report that where the surgeon's house stood there is now an inlet cut into the island, with 16 feet of water, and that every high tide the gulf washes entirely over the portion of the island which was used for quarantine purposes. The utter impossibility of using Chandeleur Island, I believe, is thoroughly shown by the above statements.

Nonsensical objections to Ship Island on account of its alleged proximity to the shore having also been met, it now remains only to refer to the charges of the faulty management of the station, by which, it has been freely alleged by interested parties, yellow fever gained admission to the coast last fall. The motives which prompted the rumor and the methods by which the rumor has grown are very plain, and may be summed up by the statement that they have been bruited for the double purpose of diverting criticism from other stations, places, and persons, and casting discredit on a service which had been previously attacked, with the result of the utter defeat of its assailants. More than a year ago a new board of health in Mississippi, influenced by one of its members, made strenuous efforts to establish a quarantine station of its own, with its position of responsibility and importance and revenues to be derived by quarantine fees which attach to stations of that character. With entire disregard of the inconsistency of their action this board, while claiming that Ship Island was too near, established a quarantine of their own on an adjoining island—namely, Cat Island—which is still nearer the coast, and then, on the plea of having their own quarantine, attempted to make the Government withdraw its quarantine from Ship Island. Of course they failed, and abandoned their project. But when the yellow fever appeared at Ocean Springs then came the opportunity for the expression of suspicion in the public prints and misstatements as to facts. Ship Island was declared to be within 5 miles of the shore, the waters between being so shallow that people could almost wade ashore. It was charged that there was free and frequent communication between the quarantine station and the neighboring coast. The medical officer in command, Dr. Smith, was declared to have so far forgotten his quarantine position as to pay a social visit on the cruiser *Montgomery*, which had anchored some 5 miles off. In fact, it may be said that the management of the station within the past three months has been under a veritable search light, thrown by inimical hands, every effort being made to find some weakness in the administration. Every charge and every statement reflecting upon the station had been satisfactorily answered in the medical journals and in the public press of New Orleans and the towns of the coast by the able medical officer in command, P. A. Surg. A. C. Smith. Never before has a quarantine station in this country been under such close scrutiny, and, in my opinion, no quarantine station in existence could present a clearer record of intelligent, painstaking administration than has been developed under this searching inquiry into the management of the Ship Island quarantine. Dr. Smith has manfully met every charge and even innuendo, and there is not a

scintilla of evidence to connect the station with the recent outbreak of yellow fever. Ship Island is owned entirely by the Government. As before stated, it is uninhabited. The station is isolated. No expense has been spared in its equipment of officers and employees. During the active quarantine season there are three medical officers stationed there, and regular inspections of its management are made by inspecting officers, and their reports printed. The anchorages are plainly marked out by buoys. Vessels are guarded at night. No communication is held with the station, not even the furnishing of supplies, excepting through the medium of a transfer barge, anchored a mile from the island, where the transfer vessel leaves its supplies, which, after its departure, are transferred to the island by a boat from the station. If suspicion alone is sufficient cause for its removal, it may be remarked "There are others."

Already there is a turn of sentiment in this matter. I have received recent protests from pilots and merchants of Biloxi against the removal of the station from Ship Island. Petitions have also been received, if it is to be removed, to remove it to Petit Bois Island, which is still nearer the shore; and recently I am informed that the largest mass meeting ever held in Biloxi declared unanimously for the station where it is, and indorsed the Marine-Hospital Service as well as national quarantine.

In conclusion, I would state that I believe some of the rumors concerning free communication between vessels in quarantine and the shore are due to the fact that the boarding and even disinfecting of vessels by the National Board of Health, and subsequently by the State board of health, were conducted at the western extremity of the island, near which is what is now known as the shipping or loading berth. This was the practice when the law was passed authorizing the removal of the station to Chandeleur Island; but since the reestablishment of the station on Ship Island there has been no use whatever made of the western extremity of the island. The quarantine station in toto has been maintained, as before stated, near its eastern extremity, but some of the old buildings of the National Board of Health are still standing unused on the western end, and this fact may have given rise to the opinion that the quarantine is still there.

Furthermore, it has been stated that vessels coming through the channel in order to reach the quarantine station must pass near the vessels lying at anchor in the loading berth. I am assured by competent authority that this is not the fact; that they need not go nearer than $2\frac{1}{2}$ miles of the vessels thus anchored, and to be assured of this fact, the Light-House Board has been called upon to place a spar buoy in the channel at the proper distance, and that vessels bound for the quarantine must pass to the west of this buoy.

Furthermore, at the time when the station was removed to Chandeleur the present national quarantine law was not in existence, nor were the present scientific appliances and procedures in use; and it may be added that these render any quarantine station at the present day a much safer place than before the said appliances and procedures were in vogue.

Respectfully, yours,

WALTER WYMAN,

Supervising Surgeon-General, M. H. S.

THE SECRETARY OF THE TREASURY.

Twelve inclosures, as follows:

- No. 1. Report of Captain Lay, United States Revenue-Cutter Service, and Surgeon Murray, Marine-Hospital Service, of inspection of all islands in the Gulf of Mexico, and recommending Ship Island. December 19, 1883.
- No. 2. Report of full board to examine sites for new national quarantine station in the Gulf of Mexico after removal from Ship Island, and recommending Chandeleur Island as the next best location after Ship Island. March 21, 1888.

- No. 3. Indorsement of National Board of Health, and which includes indorsement of location of station on Ship Island by the State board of health of Mississippi. July 24, 1882.
- No. 4. Report showing the ravages made by storm on Chandeleur Island and its utter uselessness for quarantine. December 18, 1897.
- No. 5. Protest from pilots against removal of quarantine from Ship Island. December 14, 1897.
- No. 6. Protest of general manager of Gulf and Ship Island Railroad Company against removal of quarantine from Ship Island. December 17, 1897.
- No. 7. Protest from lumber dealers of Biloxi and vicinity against removal from Ship Island. December 21, 1897.
- No. 8. Protest from citizens of Pass Christian and Gulf ports, Mississippi, against removal from Ship Island. December 25, 1897.
- No. 9. Mass meeting at Biloxi—proceedings of—protest against removal from Ship Island. New Orleans Picayune, December 29, 1897.
- No. 10. Mass meetings at Biloxi, one favoring removal and the other protesting against removal from Ship Island. Biloxi Review, January 1, 1898.
- No. 11. Protest against misrepresentations as to Ship Island Quarantine management. Rev. R. E. Steele, October 27, 1897.
- No. 12. Reply of P. A. Surg. A. C. Smith in refuting false statements concerning Ship Island station. October 14, 1897.

EXTRACT FROM THE REPORT OF THE SELECT COMMITTEE OF THE HOUSE AND SENATE OF THE LEGISLATURE OF MISSISSIPPI APPOINTED TO INVESTIGATE THE MATTER OF THE LATE YELLOW FEVER EPIDEMIC IN MISSISSIPPI.

* * * Inquiring into the conduct and management of the Government quarantine station at Ship Island, we found that nothing could be urged either against the station or its management save rumor and fear. We were unable, after the most diligent inquiry, to find the slightest evidence to warrant a conclusion that the infection was introduced through that station. We must report that the station is efficiently managed by officers who understand and conscientiously execute their duties. We can not find that the station as conducted is a menace either to the health or the commerce of the State. It is situated more than 10 miles from the shore. The quarantine grounds are strictly isolated and the regulations rigidly enforced. * * *

E. J. BOWERS.
JOS. CLINTON.
C. KENDRICK.

On the part of the senate:

A. MILLER.
JAS. PIPES.
M. A. DEES.
J. S. EATON.
H. C. HATHORN.

REPORT OF THE SPECIAL COMMITTEE OF THE SENATE APPOINTED TO INVESTIGATE AND REPORT UPON THE ADVISABILITY OF THE REMOVAL OF THE SHIP ISLAND STATION.

Mr. Vest, from the Committee on Public Health and National Quarantine, submitted the following report, to accompany Senate resolution No. 233:

“The Committee on Public Health and National Quarantine which was instructed by a resolution of the Senate adopted on January 20, 1898, “to investigate and

report whether it is advisable that the quarantine station be removed from Ship Island to some other point in the Gulf of Mexico, and that said committee shall have power to prosecute its inquiries through a subcommittee, which may sit during the sessions of the Senate at such times and places as may be thought necessary, with power to send for persons and papers and to employ a stenographer," reports as follows:

.. In pursuance of the authority given by the foregoing resolution, a subcommittee, consisting of Senators Vest, Gallinger, McEnery, and Mallory, met at Biloxi, on the Gulf coast, February 10, 1898, and invited all persons to testify before them who had any knowledge of the matters set forth in the resolution.

.. A large number of witnesses, coming from all ranks and avocations of life in the town of Biloxi and its vicinity, testified before the committee, and without an exception their testimony was to the effect that the quarantine station now located on Ship Island should not be removed.

.. The contention on the part of those who advocated the removal of the station is that the appearance of yellow fever on the Gulf coast in the summer of 1897 was due to the proximity of said quarantine station on Ship Island to the mainland, but no witness testified to any fact showing this statement to be true. On the other hand, all the witnesses testified that the yellow fever had not come from Ship Island to the mainland in 1897, and that the quarantine regulations at the station had been rigidly and carefully enforced.

.. The committee found from the coast chart and the evidence before it that the nearest point on Ship Island to the coast was distant about 10 miles, and that every precaution possible had been taken by the officials at the station to prevent any communication between vessels in quarantine and the mainland. It was shown beyond question that the harbor at Ship Island was the largest and best upon the coast, being sufficient to accommodate any number of vessels that might be brought there.

.. Chandeleur Island, which was urged as a better locality for the station than Ship Island, is located 12 miles farther out in the Gulf than Ship Island, and is simply a sand bank, without vegetation and exposed to the fury of the storms which prevail during certain seasons of the year in the Gulf of Mexico.

.. By act of Congress approved March 5, 1888, the quarantine station was located upon Chandeleur Island, but the buildings were totally destroyed by a storm some time afterwards, four lives being lost, and there remains now upon the island only the light-house, which is placed upon iron piles, the largest part of the island being subject to overflow during storms and gales.

.. The committee came unanimously to the conclusion that it was out of the question to contemplate the location of the station upon Chandeleur Island.

.. The next location suggested as a suitable one for the quarantine station was Petit Bois Island, situated some 15 miles east of Ship Island and between 7 and 8 miles from the mainland. The harbor is a good one, but not so large as that at Ship Island; and in view of the fact that Petit Bois Island is nearer to the coast than Ship Island, the committee came to the conclusion that if there was anything in the objection to Ship Island on account of its proximity to the mainland, the same objection applied with greater force to Petit Bois Island.

.. The only other island named as a more suitable one for the station than Ship Island was Cat Island, situated some miles west of Ship Island and about 7 miles distant from the coast. What has been said in regard to Petit Bois Island as to its distance from the mainland applies with equal force to Cat Island, and in addition the evidence showed that the harbor and anchorage at Cat Island were in no respect equal to those at Ship Island.

.. After hearing the evidence the committee came to the conclusion that it was not expedient to abandon the buildings and other improvements upon Ship Island, made at considerable expense by the Government, for the purpose of removing the quarantine station from that island to any of those hereinbefore named.

"It may not be improper to state that immediately prior to the visit of the subcommittee to Biloxi a committee appointed by the State authorities of Mississippi had visited Ship Island and the other islands named, and after hearing testimony for some days reported to the governor of Mississippi that the quarantine station on Ship Island was not a menace to the health of the people upon the mainland; that the yellow fever had not come through said station to the coast in 1897; and that the charges made against the officials at Ship Island, of inefficiency and negligence in the discharge of their duties, were unfounded.

"The committee submit herewith the testimony taken by them at Biloxi, and ask that they be discharged from the further consideration of the matter submitted by the resolution of the Senate."

On January 4, 1898, P. A. Surg. J. H. White, who had served during the epidemic both at Ocean Springs and at Camp Fontainebleau, and who had already collected much evidence, was detailed to make special and complete investigation as to the origin of the epidemic of 1897. His report, which follows, shows that the first case came from Guatemala through New Orleans before the opening of the "close" season, May 1.

TRUE ORIGIN OF THE EPIDEMIC OF 1897.

Report of P. A. Surg. J. H. WHITE.

NEW YORK, *January 29, 1898.*

SIR: I have the honor to submit the following report upon the special duty assigned to me in Bureau letter of January 4, 1898.

I went to Ocean Springs and Biloxi (Miss.), New Orleans, and Mobile in search of information, and finding nothing indicating any yellow fever in any other place prior to the middle of July, while there was strong evidence of the thorough infection of Ocean Springs at that date the major part of my work was necessarily there. I was greatly aided by Drs. Bragg and Bailey, of Ocean Springs, and Dr. Tebo, of Biloxi, in arriving at correct data. The origin of the fever goes back so far into the spring of 1897 that exact dates would have been entirely unattainable but for the courtesy of these gentlemen.

Dr. Dunn, of the Mississippi State board of health, was for much of the time present with me in Ocean Springs, and while I am not authorized to speak for him, I am reasonably sure that his conclusions will coincide with my own, and they were arrived at by Dr. Dunn after independent investigation.

Thomas Shannahan came from Guatemala, where he spent a short time prior to sailing at a hotel in Port Barrios, at which hotel yellow fever is said to have existed. He sailed from Port Barrios on April 8 on the steamship *Breakwater* and arrived at quarantine at Port Eads on April 12, and the quarantine season not being at hand he suffered neither detention nor disinfection of his effects. He arrived at Ocean Springs, Miss., on April 13, and was sick on arrival with chill and subsequent fever and great weakness. He went to his home, which is a hotel or boarding house. In this house resided several small children who went to school in the village with the children of other families.

On April 22 a little girl (daughter of Mrs. Bradford) who lived near and is said to have entered the house of the Shannahans, and who was at school, was attacked with what was diagnosed as spinal meningitis and died in a few days. About the same time two others of the school children living in the vicinity (on the same block with the Bradford child) sickened with a fever of one paroxysm, of short duration and great prostration. These children, Irby by name, lived in the house of Mrs. Hogsett. Mrs. Hogsett was herself taken with the same kind of fever on May 19. Mrs. Case got her meals from Shannahan house in early spring, and Mrs. Hogsett and she were very intimate—another link to connect later cases to that of Shannahan. Mrs. Hogsett was visited by Mrs. N. Keff Smith

and by Mrs. Dennet, the former the wife of Mrs. Hogsett's pastor and the latter a boarder at Ocean Springs Hotel.

Mrs. Smith developed a fever of same type with very great prostration on May 28, and her physician now says it was yellow fever. Mrs. Dennet was stricken on June 10, after repeated visits to Mrs. Hogsett and others, and the end was black vomit and death on June 13.

Here I shall follow the course of the infection in the Ocean Springs Hotel and return to Mrs. Smith's case later.

The Bergamy family came to Ocean Springs Hotel on July 16 and occupied rooms adjoining and connecting with Mrs. Dennet's room. The parents were immunes, the children nonimmunes. In one week all the children were attacked and father and mother escaped.

On July 11 Mr. S. W. Collins, a young lawyer, nonimmune, took a room across the hall from the latter (Bergamy family), and in five days he was stricken, and his physician says he is now certain that it was yellow fever.

Mrs. M. D. Holt occupied rooms in Ocean Springs Hotel on July 17, and was taken sick at the end of six or seven days.

Mrs. Hogsett, of New Orleans, came to the same hotel July 11, and was sick in about a week.

Mr. J. T. Quinlan came to same hotel June 2 and visited Major Kerr, where Mrs. Gonzalez and her little son (sick) were, and was the subject of a violent attack on June 5. Finally, as to this house, one by one each and all, without exception, of the nonimmunes were stricken, while not a single yellow-fever immune was sick at all.

Now let us return to Mrs. N. Keff Smith. When she became ill her children were sent to the house of a neighbor and friend, Mrs. D. W. Halstead, and remained there many days (Miss Nellie, the stepdaughter, excepted). On June 20 Mr. Halstead went with his aged mother and one of her grandchildren to church. These latter had not been in Ocean Springs (they live in suburbs) for over six weeks. On the night of June 24 Mr. Halstead, his mother, and the child were all stricken with the fever, which was already beginning to excite attention as the prevailing fever. This family being sick, the Smith children were taken home. (The exact time I do not know.) From July 8 to 15 all these children became sick with the prevailing fever, and about July 20 Miss Nellie Smith was so seriously ill that her father, who was absent (in Canada), was wired for and reached home latter part of July, and was himself stricken with the prevailing fever on August 6.

The next house to the north of Rev. Dr. Smith's is occupied by a negro, Willie Brown, who, with his daughter, had the fever shortly after Mr. Smith's illness—his wife, an immune, escaping. Next, north of Brown and close at hand, is the house of the Snyder family, where all the nonimmunes became sick about the latter part of June and following the preceding. Next comes another close neighbor to the northward, Louis Dolbear, and his wife and three children. All the latter sickened shortly after the Snyders, in July, and the parents both escaped. They had yellow fever in a former epidemic. Next, to the north, comes the McDonnell house, where on August 1 the fever began and went through the whole large family of children. Next, and again later, the Louis family.

Thus it may be seen that the infection was steadily marching up the street, house by house, and slowly—not like dengue.

In May sickness began in the Aline house, kept by a Mr. Leach, and was in the family of a gentleman from New Orleans. There is reported to have been intimate association with the Shannahan house. The little son of Mrs. Gonzalez stopping at Major Kerr's house, opposite Ocean Springs Hotel, and which little boy was in and out constantly at Aline house, was taken sick about the first week in June, and Mrs. Kerr followed in July and had distinct yellow fever, with albuminuria.

Early in June the Catholic Church began its preparation of children for their first communion, and among these was John White, the grandson of Mrs. Shannahan. From the middle to the latter part of June and early July the following developments among Catholic families occurred: A young girl, Alphonsine Beaugez, attended the exercises preparatory to Catholic first communion, along with John White (grandson of Shannahan) and many other children. This, I am told by Dr. Tebo, began in early June and lasted about two weeks. She (Alphonstne) was taken sick June 27, and followed by her brothers and sisters as follows: Baby, July 5; Rose, Henry, Moses, July 10; Alphonse, jr., July 11.

Mrs. Eugene Dick, niece of Alphonse Beaugez, was taken sick in early July after helping to nurse her uncle's sick; her husband followed next, and then her two children.

Leonard Fayard, working on Louisville and Nashville Railroad bridge gang, had child sick latter part of April, and two more in June; this family also Catholic.

Narcisse Seymour (fish dealer) had seven cases in his family, the first being a daughter who was at school, and was, I learn, connected with the first communion exercises before mentioned. She was at school with Bradford girl, who died before May 1 with meningitis. Two immunes in family, not sick at all. Mrs. Leonard Fayard, whose child was sick in April, is sister to Barber Westbrook, who became an early victim, and she lives near to the Hogsett house and to Mrs. Bradford, whose child died; and the child was probably at school with others named, and is not far from Shannahan's. Mrs. Bertie Case, widowed daughter of Mrs. Staples, has two children going to school with the Bradford and Shannahan children. They took sick June 11, 1897. (These I think were not Catholics, however.)

Mrs. Betancourt sickened at Shannahan's June 30, very shortly after her arrival from New Orleans—in about two or three days.

Miss Schutze, whose case was the one involved in the diagnostic controversy of September 6, may have contracted the disease at any one of several points, as she visited much, and especially at the Aline house.

Mrs. Gonzalez, I understand, was frequently at the Shannahan house, to see Cuban sympathizers stopping there, and I am told that she at one time took meals there.

Dr. Bailey, a physician at Ocean Springs, was taken sick on July 13; Mrs. Bailey and baby, August 1. Mrs. Bailey's mother went to Champion Hill, near Edwards, Miss., and from her Dr. Dunn, of the Mississippi State board of health, traces directly all the infection of Edwards, Nittayuma, and other points in middle Mississippi.

Now, having stated the facts, as nearly as obtainable, from April 8 to August, and in most of the tracings ending upon a now confirmed case of yellow fever, let us summarize.

I find that all the people at Ocean Springs had a fever, and that two-thirds of them, and possibly three-quarters, were attacked before any other city or town became aware that they had any sickness, although the neighboring towns did know that a peculiar fever existed in Ocean Springs, and must have been on the watch. The earliest cases claimed for Biloxi (across the bay) are in the middle of July, and are on the side next to Ocean Springs. When the diagnosis was finally announced, on September 6, that the disease was yellow fever, it was also asserted that dengue existed. If any dengue was present, it would be natural to suppose that some one person at least out of over 800 would have both diseases. I canvassed the town from end to end, and developed the fact that not a single person had this fever twice and that only one yellow-fever immune had it at all, and his case is not vouched for by any physician: only he thinks he had it. Not one who had so-called dengue subsequently had yellow fever, and I used three young men from Ocean Springs as disinfectors, and exposed them very freely to infection, trusting with a well-founded confidence in their immunity. These men

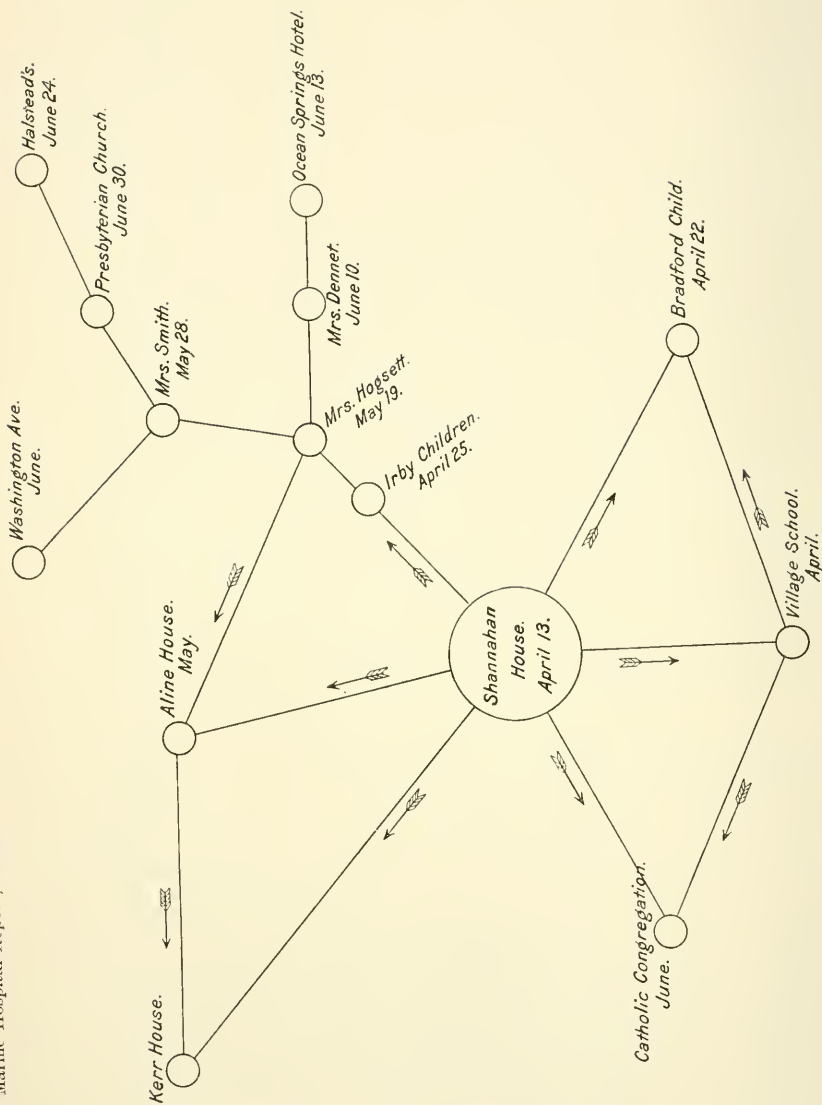


DIAGRAM ILLUSTRATING THE SPREAD OF YELLOW FEVER AT OCEAN SPRINGS, MISSISSIPPI.

continued in the employ of the service from middle September until November 20, and were under my constant observation.

Again, let us look at the matter from another point of view. If the first invasion of Ocean Springs was dengue, and only the later developments were the result of yellow fever, it will be impossible to account for the infection of Edwards, Miss., by Mrs. Anderson's going to Champion Hill, inasmuch as Mrs. Anderson was only exposed to the so-called dengue in latter part of July and not to avowed yellow fever in early September. I have traced, as may be seen, the cases of the Smith family through their only sources of infection, and going backward thus we reach the Shannahan house. I trace backward the frankly admitted case of young Collins at the Ocean Springs hotel, and again I reach the Shannahan house. I trace Miss Schutze's case to either the Shannahan house direct or through the Aline house, which was intimate with the latter, and which developed fever in May. I trace Mrs. Kerr's undoubted case to the Shannahan house through the nonimmune child of Mrs. Gonzalez, who lived at Mrs. Kerr's, and was at the Aline and the Ocean Springs houses, and probably at Shannahan's.

I assert that malaria is almost nonexistent in Ocean Springs, that Shannahan probably had a double attack (both malaria and yellow fever), and that he and his nondisinfected baggage were both foci of infection. There was no fever in Ocean Springs until he arrived. About one week afterwards the schoolmates of his nephew began to sicken, then the adult population, and finally so widespread was the disease that it became known as the prevailing fever. It moved with the steady advance of a rising tide, and took from April 13 to September 30 to immunize the town. Dengue should have done its work in a much shorter time, and if we admit, as we must, I take it, that we have been dealing with yellow fever, then it is reasonable to suppose that the first case presenting one chill, one fever of short duration, and subsequent profound prostration was yellow fever; and that one case was Thomas Shannahan, who came to Ocean Springs from Guatemala through the New Orleans quarantine on April 12, and arrived at Ocean Springs April 13, sick.

Subjoined is a diagram showing the course of infection until it has reached two congregations and the village school. It is hardly necessary to trace it any further diagrammatically. Finally, I wish to express my appreciation of courtesy shown me by the doctors and clergy of Ocean Springs and assistance rendered me in arriving at the truth.

Very respectfully, yours,

J. H. WHITE,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL, MARINE-HOSPITAL SERVICE.

POST-EPIDEMIC DISINFECTION.—WINTER OF 1897 AND EARLY SPRING, 1898.

With a view to the prevention of the recrudescence of the fever in 1898, I issued the following circular letter early in the fall of 1897, pointing out the need of thorough post-epidemic disinfection, the keeping of accurate records of cases occurring, and the location of same:

CIRCULAR CONCERNING POST-EPIDEMIC DISINFECTION.

[Circular letter.]

WASHINGTON, D. C., *October 11, 1897.*

To the medical officers of the Marine-Hospital Service, acting assistant surgeons, and State and municipal health officers:

Anticipating the work of post-epidemic disinfection, which will be necessary to prevent the recurrence of yellow fever next season, your attention is called to the importance of keeping a record of the name of each person contracting yellow fever, and the street number of each house where the fever occurs.

WALTER WYMAN,

Supervising Surgeon-General, U. S. M. H. S.

Upon the virtual disappearance of fever in the South I issued a circular letter to officers of this Service, and to State and municipal health officers throughout the United States, recommending certain plans of post-epidemic disinfection.

This circular letter, with copies of official orders to Passed Assistant Surgeon White and Surgeon Carter, on the subject of post-epidemic disinfection, are herewith appended.

CIRCULAR LETTER RELATING TO POST-EPIDEMIC DISINFECTION AND AERATION.

TREASURY DEPARTMENT,

OFFICE OF SUPERVISING SURGEON-GENERAL, M. H. S.,

Washington, D. C., December 1, 1897.

To commissioned officers of the Marine-Hospital Service, acting assistant surgeons, and State and municipal health officers:

Referring to circular letter issued by this Bureau October 11, 1897, in which attention was called to the importance of keeping a record of the name of each person contracting yellow fever, and the street and number of each house where yellow fever occurred, I have to state that, inasmuch as the fever has disappeared in the South, it is now deemed necessary to begin the work of post-epidemic disinfection. In order that the same may be uniform and thorough in its character, the following plan is recommended:

HOUSE-TO-HOUSE INSPECTION.

(a) The medical officer in command shall make, or cause to be made, house-to-house inspection of all infected localities and obtain complete lists (giving number and street when practicable) of all buildings, whether private dwellings, public houses, or hospitals, in which yellow fever occurred or where suspicious disease existed during the past summer and fall, the city or town to be divided into districts.

(b) This inspection should be made by competent sanitary officers, under direction of the medical officer in command, and every part of the premises must be carefully inspected, including the rooms, basements, cellars, passages, closets, and garrets; the sinks, drains, cesspools, latrines, privies, or water-closets; the stables, sheds, outhouses, pens, etc.

(c) The inspection is not only for the purposes of disinfection, but also is intended to place each house and its surroundings in a perfectly sanitary condition, and includes the inspection of all streets, alleys, and byways.

(d) The inspection should include an examination into the water supply, and particularly as to the proximity of wells, cisterns, and springs to the privies, stables, pens, and other suspicious surroundings.

LIST OF YELLOW-FEVER SUFFERERS AND SUSPECTS.

A complete list of all persons exposed to, or who may have contracted the disease, with the result in each case.

(a) If death resulted, where buried and under what precautions.

(b) If recovered or removed to another domicile in the same city, town, or place (or if departed from the neighborhood), ascertain all facts and make note of the same, in order that it may be determined what action shall be taken in each case.

GENERAL DISINFECTION.

(a) It is recommended that after the inspection above provided for has been made, the medical officer shall designate a competent sanitary officer to perform the thorough disinfection and cleansing of all houses and premises which he may have decided require the same, said disinfection to begin as soon as practicable after the inspection referred to has been made in any locality.

(b) It is recommended that the removal of all refuse, garbage, and other deleterious matter be included in the work of disinfection, and that all articles of little value, such as old rags and other accumulations of worthless material, be destroyed, whether found in dwellings or "slopshops."

(c) It is recommended that the inspectors inform all parties whose houses are visited that no injury to their houses or contents will result from the disinfection contemplated, that even the most delicate fabrics can now be rendered free from contagion by a harmless process of disinfection, and that it is absolutely necessary for the protection of themselves and the community in which they live.

DISINFECTION OF HOUSES.

(a) The use of formaldehyd generators, or lamps, is recommended for the disinfection of houses and their contents. The details of their management for generating and applying formaldehyd gas should be fully understood by the sanitary officers in charge of the work.

(b) All the contents of the houses, including wearing apparel of every description, should be spread about the rooms; bedding or mattresses not used by the sick should be placed upon the chairs or tables, or, better still, hung up in the yards and beaten; soiled bedding and mattresses used by the sick should be steamed or destroyed; trunks, closets, and bureau drawers, and all closed receptacles, should be opened and their contents exposed.

AERATION.

Both before and after disinfection the houses should be opened and thoroughly aired—"chilled," if the weather is favorable—and later on all the rooms, closets, etc., should be exposed to several hours of airing during freezing weather, and repeated at intervals during the winter.

DISINFECTION OF STABLES, PENS, ETC.

The use of bichloride of mercury solution, 1-500, or carbolic acid solution, 50 parts to 1,000 parts (applied by means of a spray), is deemed sufficient if all exposed surfaces are completely saturated. Privies may be disinfected by chloride of lime or strong solution of carbolic acid.

WALTER WYMAN,
Supervising Surgeon-General.

INSTRUCTIONS TO OFFICERS IN CHARGE OF POST-EPIDEMIC DISINFECTION.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL, M. H. S.,
Washington, D. C., December 1, 1897.

SIR: You are hereby placed in charge of post-epidemic disinfection and aeration on the part of the Marine-Hospital Service at all places in the State of Mississippi where yellow fever has appeared during the past summer and fall. A list of said places is herein inclosed. In addition to these specified places, it should be your duty, by inquiry and other means within your power, to ascertain if yellow fever

has existed in any other locality, however remote, and to visit said places and carry out these instructions.

The measures to be enforced are enumerated in the inclosed memorandum regarding post-epidemic disinfection and house aeration.

Hospital Steward Cragg, who has had yellow fever, has been ordered to report to you to assist you in these duties. He will be of service in keeping records and accounts, and in any other manner which you may direct.

On arriving in a given municipality or township, you will immediately call upon the mayor and the health authorities and secure their cooperation. You should inform them that, in view of the large amount of work to be accomplished, it is absolutely necessary that the expenses therefor should be borne, so far as possible, by the local authorities, and it is the purpose of the Marine-Hospital Service only to meet such expenses as are absolutely necessary upon certification by the proper health authorities. In some localities it is obvious that part of the work may be done and paid for by the local authorities, but that it will have to be supplemented by the Service assuming a portion thereof.

A list of every house in which there has been yellow fever, and a list also of houses where there have been cases of suspected fever, should be obtained, and the work then should be prosecuted systematically. The importance should be insisted upon of both disinfection and aeration. With regard to disinfection, all of the known agents should be used as required in special cases. Steam disinfection of mattresses and clothing may be required, and for this purpose you are authorized to have the steam disinfecting chamber placed on a flat car rented for the purpose and carried through the desired localities. Should this apparatus be considered insufficient for the work required at any given place, recommendation should be made for the construction of a steam disinfecting car such as was in use at the detention camp at Waynesville in 1895. It is not unlikely that it will be found necessary to burn some mattresses and possibly some clothing. In this event it is suggested that arrangements be made, either at Camp Hutton, Fontainebleau, or Mount Vernon Barracks, for the shipment of mattresses which are practically new to any desired point, for the purpose of replacing those which are burned and which belong to people who are unable to stand the loss.

You will make report from each town visited and disinfected at the close of the work at that place, and reporting the next place to be visited. It is suggested that in some places visited there may be need of some professional help, and should this be the case the best local talent should be secured, and nominations for his appointment for temporary service should be duly reported to the Bureau with rate stated.

It is suggested that inasmuch as it is necessary for you to visit Vicksburg, Jackson, and Meridian before proceeding on this duty, said duty might begin at Edwards and adjacent towns.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General, M. H. S.

P. A. Surg. J. H. WHITE,

United States Marine-Hospital Service, New Orleans, La.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL, M. H. S..

Washington, D. C., January 4, 1898.

SIR: Having arrived in Washington and completed the special work assigned to you by Bureau letter of January 3, you are directed to proceed to the Gulf coast, and to relieve P. A. Surg. J. H. White of the duties which were assigned to him by Bureau letter of December 1, a copy of which letter you will find printed

in the public health reports. You will receive the reports made by Passed Assistant Surgeon White under the orders aforesaid, and transmit them with your completed report.

In addition to the work assigned to P. A. Surg. J. H. White, you are directed to assume the supervision on the part of the Service of the disinfection of all places in the South which were infected during the recent epidemic.

Respectfully yours,

WALTER WYMAN,

Supervising Surgeon-General, U. S. M. H. S.

Surg. H. R. CARTER,

United States Marine-Hospital Service, Washington, D. C.

In accordance with the plan above outlined post epidemic disinfection was carried on throughout the fall of 1897 and winter of 1897—98. Its performance entailed great labor on the officers of the Service and considerable expense, the State and local health authorities cheerfully aiding to the full extent of their powers and ability. It involved the necessity of sending experienced officers familiar with disinfection, the transportation to the infected localities of disinfecting apparatus, the cooperation of the local authorities, as well as the householders in whose residences yellow fever or suspected yellow fever had prevailed. The value of post epidemic disinfection has been questioned, but this work has been justified by the results. Eleven towns and cities were thus disinfected in Alabama and there has been no recurrence of the disease in that State. All the towns on the Gulf coast of Mississippi where the disease was so prevalent, as well as those in other portions of the State, were likewise disinfected to the number of seventeen, and there was no recrudescence of the fever this year in Mississippi excepting in the town of McHenry, where the disease was made known to the Bureau July 9, and was found to have existed in mild form some three weeks previous to this date, the cause of its recrudescence being due, as reported, to an old ice house which escaped disinfection after the 1897 epidemic. It was supposed to have been used as an ice house in 1897, but had actually been used as a latrine by people from an infected house, and in cleaning it out in the summer of 1898 two workmen were simultaneously stricken with yellow fever. To the prompt discovery of the fever is due the ability to suppress the epidemic, which was effectually done after there had been a total of 22 cases. In Louisiana four localities were disinfected. In New Orleans, although the Service assisted the local authorities very materially, for which acknowledgment has been duly made, for many reasons a complete disinfection was impossible, and the yellow fever in the summer and fall of 1898 in New Orleans was without doubt a recrudescence. The origin of the fever in 1898 in Franklin has not been satisfactorily demonstrated, but the assumption has been made that it was also a recrudescence, due possibly to the tearing down of an old residence which had been infected the previous year.

Of the forty-two cities and towns in Alabama, Mississippi, and

Louisiana, in which post-epidemic disinfection was performed by the Service, in three there was recrudescence, viz, McHenry, New Orleans, and Franklin, the cause of recrudescence being as previously stated. These three demonstrate the liability of recurrence after a mild winter, while the escape of the remaining thirty-nine is certainly demonstrative of the value of post-epidemic disinfection.

Full reports upon this work in detail will be published in the succeeding report of the Service.

YELLOW FEVER OUTBREAK IN LOUISIANA AND MISSISSIPPI IN THE SUMMER AND FALL OF 1898.

THE OUTBREAK AT M'HENRY, MISS.

The suppression of the outbreak of yellow fever at McHenry, Miss., in May and June of this year, is an event of such great interest—being the first recorded outbreak that has been suppressed without spread—and the lessons to be derived therefrom are so important, that I submit herewith a report compiled in the Bureau from official correspondence, and with the aid of Surg. H. R. Carter and P. A. Surg. J. H. White, giving the details of its management.

MANAGEMENT OF THE EPIDEMIC.

It has been vigorously asserted that yellow fever may not hibernate from one summer to another in the United States. This outbreak gives proof to the contrary, following as it did the epidemic of 1897, which, as is now known, began in Ocean Springs as early as April but was not recognized until the last week of August, and which visited forty-two cities and towns in ten States, with a total of 4,429 known cases and 484 deaths. The Service undertook a post-epidemic disinfection of the infected towns. It has now been ascertained that in May of the present year, although McHenry had been subjected to this post-epidemic disinfection, there was a focus of infection, which, by reason of its peculiar character, had not been suspected and had not been disinfected, namely, an ice house which had been used as a dumping place for refuse, including dejecta, during the prevalence of yellow fever in McHenry in 1897; no ice had been stored in it since the summer of 1897, but it was partly full of rotten sawdust. The first two cases occurring in McHenry worked together in cleansing this ice house some seven days prior to attack. They had nothing else in common and were taken sick almost simultaneously.

McHenry is a small village located on the Gulfport and Ship Island Railroad, a town of about 323 white and 67 colored people. Thirty of the population were immune (by statement) to yellow fever, this number of cases, with one fatality, having occurred in McHenry during the yellow-fever outbreak of 1897.

Early in the spring of the present year, fearing a recrudescence of the fever, the suspected territory in Louisiana, Mississippi, and Alabama was divided between two experienced officers of the Service, one stationed at New Orleans and the other at Mobile, and they were instructed by the Bureau, without special authority at each time, to visit any suspected case, with a view to the early detection of the fever. They were also authorized to employ sanitary inspectors, whose duty it should be to keep a bright lookout for any evidence of the fever; and it was through one of these inspectors that official information of the suspicious case in McHenry was furnished. The information was furnished at about

the same time to the representative of the State board of health and to Surgeon Murray of the Marine-Hospital Service. The diagnosis was promptly made by the State health officer and immediately confirmed by Surgeon Murray and reported to the Bureau, June 9, 7 cases having been discovered. A cordon of 18 guards was at once thrown around the town to prevent egress therefrom pending an investigation of the place. The number of cases was quickly determined, and guards were placed at the infected localities or houses.

Surgeon Carter arrived at McHenry on the morning of June 10, and under his advice a house-to-house inspection was made. An inspection was also immediately instituted by Surgeon Carter of all the villages and houses along the line of railroad which runs through McHenry from Gulfport on the south to Hattiesburg on the north, no infected houses being found, and also along the line of the Northeastern Railroad from Hattiesburg toward New Orleans.

At the time of the discovery there were eight foci of the infection. There were two other cases which were subsequently discovered (four or five days afterwards). Coincidentally with the discovery a careful inquiry was made as to persons who had left the foci of infection, and such persons were followed to their visiting places. One was traced to Encutta by the State board of health and placed under guard, and all necessary precautions taken by the board, and the disease did not spread. One was an Italian, who went across to the Northeastern Railroad and boarded the train for New Orleans, was caught by the Marine-Hospital inspector on the train, taken to New Orleans, and sent to Camp Fontainebleau, but did not develop yellow fever. Another was a young woman who also reached New Orleans by the Northeastern, and was sent to Nashville to serve out her quarantine. It is presumed she did not develop yellow fever. A fourth, Mr. Breeland, went to his house in the country, about 4 miles from McHenry, and developed yellow fever there. He left before quarantine was laid, was discovered later with yellow fever, and precautionary measures were taken at the house, and there was no spread. The Italian mentioned above left after the quarantine had been established; the others had left before.

It should be stated that an inspector was stationed at Gulfport, the southern terminus of the Gulfport and Ship Island Railroad (junction of Louisville and Nashville), as soon as the first intimation of yellow fever was received; this with a view to protecting the line running between New Orleans and Mobile. His instructions were to make a house-to-house inspection of the town, which he did, and no yellow fever was found.

A train-inspection service was established on the Northeastern Railroad on the morning of the 11th, two inspectors running between Hattiesburg and New Orleans. No one was allowed to board the train between Hattiesburg and Pearl River, going either way. The Mississippi State board placed an inspector on the Gulfport and Ship Island Railroad, from Hattiesburg to Gulfport, to prevent anyone from McHenry getting aboard the train. By order of the State board the passenger train was not allowed to stop at McHenry. The freight crews were allowed to stop a length of time sufficient to transact necessary business, but the crews were compelled to stay on the right of way and not enter the town proper. Returning, this privilege was permitted under the surveillance of sanitary guards placed there by the Mississippi board of health.

After a short time all the work within the town of suppressing the fever was conducted by the Service in aid of the State board. The outside work, cordon and guarding the houses, remained entirely under the supervision of the State board. A house-to-house inspection was made each day of the whole town, every individual in it being listed and seen by the inspector in his morning rounds. This was done for the double purpose of the early discovery of cases of sickness and to see that no one had passed the cordon. The sick, as soon as discovered, were, wherever practicable, moved from their residences to a hospital tent and

cared for, either by a member of their family or, where it would be allowed, by an immune nurse; the rest of the family being isolated in their tents at a considerable distance from the hospital or from the residence portion of the town. Both tents were under guard. For this it was necessary to furnish food and medicines, etc., for the sick, as well as subsistence for the well, who were thus cut off from means of making a livelihood. This was the work of this Service. The suspects were inspected by a medical officer twice daily, and when one of them developed fever he was left in the tent and the remainder moved to another tent. In no case did any fever develop in the second tent.

Seven existing cases were discovered, and the roster showed there had been eighteen and that the disease had appeared as early as May 20. Subsequent observation showed there were two other cases at least that were not counted in the eighteen, so that really twenty cases had occurred before the disease was known. Subsequent to the discovery and the inauguration of preventive measures there were eight additional cases. Disinfection of infected premises was begun immediately on arrival of Surgeon Carter.

It was believed that the ability to suppress the fever depended upon three things—the early discovery of the cases, the quick isolation of suspects, and the thoroughness of disinfection. The aim was to make the disinfection as practicable as possible. Such articles as could be immersed in an aseptic solution, or boiled, were thus immersed or boiled. Articles of bedding, etc., for which this was impracticable, were in the beginning burned. As soon as a steam chamber could arrive, these were steamed instead. Other light fabrics, such as ladies' hats, etc., were submitted to formaldehyd gas at about 6 per cent volume, not less than twelve hours' exposure, in a room rented, and rendered air-tight, for the purpose. The houses themselves, where tight enough for gaseous disinfection, were first subjected to disinfection with sulphur, as much as could be burned in them, and then thoroughly washed down with 1:500 solution bichloride of mercury. This was done by a heavy pump and hose, throwing the solution forcibly into every crack and crevice of the house. The ground under the house was generally left mud, i. e., saturated with the solution. Some houses, not admitting of gaseous disinfection, were simply subjected to this latter process. Some, for which neither seemed to promise sufficient security, were purchased and burned, the price averaging from \$15 to \$40. Six houses were burned altogether, five in McHenry and one at Perkinson, the latter on account of a suspicious case. The disinfection of the premises was considered important, and was certainly the most difficult of these processes. All trash, and every kind of organic matter possible to remove, was taken immediately from the house and around it, and was burned. This mass was then drenched with 1:500 bichloride. The privies were washed out with strong bichloride solution, and removed. Their site and as much of the ground surrounding the house, so close to the house as to involve danger, was covered with wood waste, rosin from turpentine stills, and burned. In some cases, where there was very little organic matter or trash on the ground—this was substituted by a larger area of bichloride drenching; but in no case was the privy considered disinfected save by absolute destruction by fire, its site being left a bed of coals. No cesspools or drainage in town. Before the disinfection was considered complete practically all of the timber sheds, old sawdust, and similar material strewed about the place were destroyed. All privies in town were treated as described for the infected territory, and the whole town cleaned up as thoroughly as it was possible to clean anything. About eighty-five houses in town. It is believed that the efficiency of this work depended absolutely upon the efficiency of the disinfection, and if a further recrudescence of the fever had occurred it would have been from some fomites having escaped the efforts to destroy, which is always possible to occur. In the disinfection of premises where, as in McHenry, the slops, and not infrequently the excrement of the sick, were thrown into the back yards,

it is always possible for rains to have washed infected material into piles of organic matter, sawdust, trash, etc., capable of serving as culture media, and it is not always possible to tell how far this may go. In no case was this disinfection left to subordinates. Until taken sick, Surgeon Carter personally supervised every phase of it, and when incapacitated it was taken charge of by Acting Assistant Surgeon Waldaner, whose work the previous year at Clinton and Nitayuma, and his experience in McHenry, guaranteed his care and efficiency. Past Assistant Surgeon Geddings visited McHenry four or five times during the time Surgeon Carter was absent, and also supervised this work.

The cordon was as effective as it was practicable to make it. It would have been impossible to prevent some people walking out of McHenry through the cordon had they been determined to do so, especially as there were a large number of single men in the town who had no home ties, simply working in the sawmills there. It was exceedingly important to make it to the interest of the people not to leave by an illegitimate route. For that purpose Camp Fontainebleau was opened, and three special trains run from McHenry to Fontainebleau, taking all who wished to leave. A camp of twenty-five tents, sent from Camp Hutton, was erected and established in six hours by Passed Assistant Surgeon Geddings. For the same purpose a small camp was opened, inside the cordon but out of the city, for the purpose of allowing a number of laborers engaged in the "naval store" to leave the camp in safety to pursue their avocations. Some of these men (they were all negroes) would unquestionably have passed the cordon had this camp not been established.

Referring again to train inspection, service inspectors, under P. A. Surg. J. H. White, were put on the Louisville and Nashville road to guard against the drift of people from the territory on the Gulfport and Ship Island while it was being inspected. As State inspectors were sent up on this road, as well as inspectors from Mobile, it seemed unnecessary to continue three sets of inspectors, and these were removed and replaced subsequently at the request of the Mississippi board, the State board of Louisiana, and of Mobile, who withdrew their inspectors. These inspectors were to prevent boarding of trains by people from suspected territory. A careful watch was kept upon Gulfport, the southern terminus of the Gulfport and Ship Island Railroad. There were two points especially contiguous to Gulfport, viz., Long Beach and Mississippi City. At these two points, Long Beach and Mississippi City, people were allowed to take passage on the Louisville and Nashville, provided they had a certificate from an accredited officer of the Marine-Hospital Service or the State board of health, stationed at these points for this purpose. Dr. Folks, of the Mississippi board, was at Gulfport; Dr. Scott, of the Marine-Hospital Service, at Gulfport, and Dr. Harry at Mississippi City, the two former visiting Long Beach on request.

It was adjudged advisable to keep an inspector at Gulfport permanently, who made a house-to-house inspection as often as he could, and saw all the sick each day. No cases of fever occurred there, but in certainly two, and possibly more, instances a panic was averted by his diagnosis of cases that had been suspected of being yellow fever. The train crews previously mentioned who had been exposed to possible infection in McHenry were moved out of Gulfport, and relay stations established at two points—Landon, between Gulfport and McHenry, and Maxie, at the junction of the Lamberton branch of the Ship Island road, 35 miles from Hattiesburg—the crews taken out of Gulfport running the intermediate freight trains. These relays were under the supervision of two sanitary inspectors, and were continued until prolonged inspection showed that the territory previously adjudged suspicious on the Gulfport and Ship Island and Northeastern roads were free from fever, and quarantine against it removed by the Mississippi board of health. They were then substituted by a relay operating only in

McHenry, the rest of the territory being now accounted clean. A number of suspicious cases were reported by inspectors at various places. The diagnosis was clearly not yellow fever in all save two cases. In both of these balance of evidence was strongly against the diagnosis of yellow fever. Yet, as there was some evidence on the other side, the same measures of isolation and disinfection were adjudged advisable, and as in McHenry in all doubtful and in most recognized cases and cases adjudged to be recently convalescent, the agglutinative reaction of the bacillus icteroides was made use of, samples of blood being sent, under sanitary precautions and with the sanction of the health authorities, to Dr. P. E. Archinard, acting assistant surgeon, Marine-Hospital Service, for examination. In one case only was this reaction pronounced present where the case was considered not yellow fever from clinical evidence, and in this there was strong evidence to show that the patient had had yellow fever in the previous year. In several instances, especially at Gulfport, the negative result of this test enabled a clearing up of cases which otherwise had been somewhat doubtful, and averted a panic and unnecessary quarantine.

The type of the fever at the beginning was mild; the later cases, however, were of at least average severity. Favorable comment should be made of the assistance received from the McHenry people, who bore good-naturedly and uncomplainingly the inconvenience. Effort was made to avoid hardships, but a long and close quarantine and a thorough and very perfect disinfection of premises was made. The complaints were very few and in most instances were very reasonable or caused by misunderstanding.

At the beginning, at the request of the Mississippi board of health, the Service took charge of the disinfection. After a little the measures in the town looking to the suppression of the fever, save the guarding of houses, was turned over to the Service. The same may be said of the train relays and the inspection on the Northeastern Railroad, and latterly that on the Louisville and Nashville road. The inspection of the Gulfport and Ship Island road was from the beginning to the end carried on by an inspector of the Mississippi board of health, though towns on the road were inspected by the Service, and the camps were, of course, exclusively under Service supervision.

By the house-to-house inspection it was found that only three people passed out of the cordon, all of whom were either brought back or isolated immediately. Thus, although people could undoubtedly get out of McHenry on foot and by taking some risk, yet in fact they did not so leave to the risk of other places. A knowledge of this fact did much to quiet apprehension of neighboring places.

Passed Assistant Surgeon White was in charge of all the train-inspection service, inspecting the inspectors, relieved Surgeon Carter during the latter's illness, and had charge of outside work at all times, it being necessary for someone outside the line of operations to communicate with health officials in person and to arrange for the purveying of supplies for the epidemic work proper and for the camp. There was no friction between the State and local health officers and the officers of the Service, all working together in harmony in a common cause.

No new cases of yellow fever occurred at McHenry after June 29, and by the 4th of July there was only one case under treatment; all convalescents had been moved into new tents, the old tents had been disinfected, and it had been determined to narrow the quarantine limits.

Disinfection progressed steadily, and on the 8th of July the last case of yellow fever was discharged and all bedding, etc., disinfected. On July 12 the State of Mississippi raised its quarantine against all points in the State except McHenry and Passed Assistant Surgeon Geddings was ordered to close the detention camp.

There were in all 22 cases at McHenry, 1 at Eucutta, and 1 near McHenry in the country. Total, 24 cases, with no deaths. First case May 20, 1898, and discharge of last case July 8, 1898.

The following letter from Passed Assistant Surgeon White, in command at McHenry—on account of the illness of Surgeon Carter—gives an exact account of the situation in the State at this date.

CAMP FONTAINEBLEAU, MISS., *July 9, 1898.*

SIR: There remains at McHenry not a single case of yellow fever, nor, as far as we know, any infective material. McHenry is still quarantined, and will be, in accordance with agreement between the Service and Mississippi board of health, for the next two weeks.

The relay stations on the Gulf and Ship Island Railroad, which were placed at Maxie and Landon on that road, under Dr. Carter's advice, will be removed to-morrow, as will also every one of our railroad inspectors on all three roads, namely, Louisville and Nashville, New Orleans and Northeastern, and Gulf and Ship Island. There will then remain only the restrictions imposed upon the town of McHenry itself by the Marine-Hospital Service and the Mississippi State board of health. Both the States of Mississippi and Alabama are perfectly satisfied with this arrangement, and the only objection to removal of quarantine comes from the Louisiana State board of health, which still insists upon quarantine absolutely and without exception of the three coast counties of Mississippi, namely, Harrison, Jackson, and Hancock.

The operations of the Service have been conducted on the following idea: If you will look at the map you will see that to some extent the three railroads involved form a misshapen letter "H." McHenry being near the center of the crossbar of this letter. With McHenry cordoned and a census taken twice each day, by name, we have made it a positive certainty that no one has escaped, save three, since the town was cordoned, and those three were returned. A neutral zone, to wit, the territory between Maxie and Landon, on either side of McHenry, was established a little later on by means of relay stations at those points. A medical inspector, Dr. Stone, was daily up and down the Gulf and Ship Island road seeing all the sick, and assuring himself repeatedly that there were no suspicious cases in any town on that road from Hattiesburg to Gulfport. Another inspector, Dr. J. T. Scott, was stationed at Gulfport with Dr. Folkes, of the Mississippi board, and they made joint daily inspections of all the people in Gulfport, with the end in view of discovering any seepage from the neutral zone. They also made occasional inspections of Long Beach and Mississippi City, the two nearest towns, with the same end in view. It will thus be seen that permanent inspectors were watching the whole line of the crossbar for suspicious cases, and to keep an eye on the movement of persons. Two train inspectors kept watch of the passengers north and south bound on the Northeastern Railroad, and by making them prove their origin were able to show that if any seepage existed from the neutral zone it did not reach this trunk line of travel. Three inspectors performed a similar duty on the line of the Louisville and Nashville between New Orleans and Mobile, and they also are able to state that no seepage from the infected zone has traveled over this trunk line. Repeated visits have been made to the coast towns at various intervals by representatives of the three State boards interested and of this Service with an invariably negative result, and the same thing has been done on the New Orleans and Northeastern.

This has been and is our line of procedure, and will be until to-morrow night when, as before stated, we suspend all operations except in the town of McHenry itself, which town it is proposed to rigorously clean up.

I would call your attention to the fact that there has been no one leaving McHenry; that the people there have voluntarily submitted to a perfect quarantine of non-intercourse; that the cases have all recovered, and the disinfection is practically completed. With these facts in mind I have, at the suggestion of Dr. Carter, who is still too weak for duty, notified Dr. Souchon of our intention to remove all

inspectors on to-morrow night. A proposition was made by the Louisiana board to release from quarantine the towns of Pass Christian and Bay St. Louis, provided the Mississippi board or the Marine-Hospital Service would undertake to quarantine Bay St. Louis and Pass Christian against the towns to the eastward thereof. This proposition we could by no possibility accept, for reasons already given; neither of us now engaged in the work have the faintest belief that there is any infection on the line of the Louisville and Nashville Railway, and we feel that it would be a prostitution of the influence and name of the Service to use it for the enforcement of an unnecessary restriction upon commerce, and that such a use would seriously impair our ability in the future to impose really necessary restrictions.

When our arrangements were completed, as outlined above, an endeavor was made to obtain the consent of Alabama and Mississippi, as well as Louisiana, for the traveling of passengers whose identity and origin could be indubitably established by reliable certificate or by other equally trustworthy proof. To my surprise Alabama and Mississippi threw down the bars absolutely and allowed intercourse without any restriction whatsoever, leaving it for me, in Dr. Carter's absence at McHenry at that time, to assert the right of the Service to demand such certificates as a matter of interstate safety. Louisiana, on the other hand, agreed to accept the certificates from Mobile, but held rigidly to a nonintercourse quarantine with the coast towns, and to this nonintercourse quarantine Louisiana still holds and appears determined to hold for an indefinite period.

Respectfully, yours,

J. H. WHITE,

Passed Assistant Surgeon. U. S. M. H. S.

SURGEON-GENERAL, *Marine-Hospital Service.*

RESOLUTIONS OF THE STATE BOARD OF HEALTH OF LOUISIANA THANKING THE UNITED STATES MARINE-HOSPITAL SERVICE FOR AID RENDERED DURING THE OUTBREAK OF YELLOW FEVER IN MISSISSIPPI DURING JUNE AND JULY, 1898.

NEW ORLEANS, *August 9, 1898.*

DEAR SIR: I beg to transmit to you the following resolutions, adopted by the Louisiana State board of health at its meeting held 8th instant:

"*Resolved*, That the Louisiana State board of health hereby tenders its thanks to the United States Marine-Hospital Service for valuable and much appreciated assistance recently rendered at Camp Fontainebleau and in railroad inspections.

"*Resolved*, That this board hereby expresses the highest admiration of the splendid work done by the United States Marine-Hospital Service in cooperating with the Mississippi State board of health in stamping out the yellow fever at McHenry by hard work and modern sanitary methods; which achievement will have incalculable beneficial results in the future.

"*Resolved*, That a copy of these resolutions be sent to the Supervising Surgeon-General, United States Marine-Hospital Service, Dr. Walter Wyman, and to Dr. H. R. Carter, surgeon, United States Marine-Hospital Service."

Very truly, yours

G. FARRAR PATTON, M. D.,

Secretary Louisiana State Board of Health.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

THE EPIDEMIC AT FRANKLIN, LA.

On the 11th of August, 1898, a report was received at the Bureau that a death from yellow fever had occurred at Franklin, La., and Surgeon Carter was ordered to investigate the truth of this report at

once. During the epidemic of fever in 1897 Franklin had three reported cases with one death. It was hoped that the report of this yellow-fever death would prove to be false, as had other reports during the present summer; but on the following day, August 12, Surgeon Carter wired that "from the history the diagnosis was correct," and that he believed it to be the only case that had occurred. "The origin of it," he thought, "was the pulling down of an old house infected last year."

All those, as far as known, exposed to infection, even though immune, were located and placed under observation and inspection twice a day, and all cases of fever of any kind were reported to the board of health; disinfection also of infected localities was at once inaugurated, and a cordon arranged for. No cases occurred from this time until the 24th of the month.

In the meantime disinfection of infected places was continued, and it was believed to be efficient. The house in which the original case occurred was burned, together with the sheds and outhouses and the adjacent ground and all the trash and possible fomites within what "was thought to be a sufficiently large space to preclude the spread of infection." The condition of affairs at this point, as well as the operations of the Service there, can best be seen from the accompanying letter of Surg. H. R. Carter:

FRANKLIN, LA., *August 22, 1898.*

SIR: There has been no case of yellow fever reported since the death of Hopkins. I have been to see the men, 3, who were directly exposed to infection and sickened with fever; 2 were certainly not yellow fever, and the other presented no distinctive symptoms of it.

All whom I could trace as having been exposed to the (presumable) infection from the sick man have been under daily observation by Dr. Beverly Smith, and in three more days the ten days from last exposure will have passed. Similarly I have followed up those who had been exposed to the original source (hypothetical) of infection. Here there was less accuracy in their determination. The premises adjudged infected were immediately vacated and put under guard, and the most essential disinfection done as soon as we could, working in two gangs. The work was completed thoroughly, I believe, at our leisure.

There has been a fairly good cordon around the town, guarding all roads and paths and the bayou, so that one could not ride or drive out of Franklin. In addition, the part of St. Marys Parish between the Atchafalaya and its western boundary has had a railroad quarantine, no passenger or through freight trains stopping in it. The cordon has been well managed, partly paid by the town and partly by the Service, the town being unable to bear the whole expense. The railroad quarantine against the parish outside of Franklin will be raised to-morrow.

* * * * *

There is a high probability that the opinion expressed in my telegram that the old building, partly torn down and partly repaired, was the original source of infection is correct.

If it be not, of course the original source still exists; if so, it should show its presence by producing other cases of fever before the quarantine is raised, about September 1 or 2. This, however, I feel to be the real danger, and this also is the reason for holding the quarantine and inspection on longer than usual.

I believe the disinfection has been thorough. All who engaged in it, and in tearing down and burning the remainder of the building—some being of doubtful immunity and some nonimmunes—are still being inspected daily.

Whether there may not have been light cases of yellow fever unreported it is hard to say; if there have been there will be some grave enough to be noted prior to September 1.

* * * * *

Respectfully, yours,

H. R. CARTER,
Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

As stated above no cases of yellow fever were reported at Franklin from the 11th to the 24th of the month, and it appeared that possibly the case was a sporadic one, and that, as a result of the thorough disinfection and inspection there would be no further spread, but the following telegram from Surgeon Carter on the 24th of August dispelled any such expectations:

The case reported as suspicious is one of yellow fever. It may be from a former focus. The case is under guard. He had been ill one day when discovered. Some of the industries here have shut down and others will, and it may be necessary to open a laborers' detention camp, as the men out of work will evade quarantine. I am making provisional arrangements.

Surgeon Carter was at once instructed to arrange all details for the establishment of a detention camp and also to perfect all details for the inauguration of train-inspection service, so that in case of necessity for either arising no time would be lost in preparation.

Another suspicious case was reported on the 27th of August, and one undoubted case of yellow fever on the 30th in the person of a physician who had been exposed, and the following day the case reported as suspicious was confirmed as yellow fever. Surgeon Carter informed the Bureau that as yet, as all cases were traceable, there was still a chance of suppressing the disease, but that the weather was against such suppression.

Unfortunately, however, the fever continued to increase, and from this time on cases were reported almost daily, a total of 18 cases being reached by September 7. Disinfection was continued, cordons were placed around all infected houses, inspections were made of all points inside and outside the parish, all suspects were carefully watched, and, in short, all possible precautions were taken. A detention camp for those wishing to leave the vicinity was opened, and on the 5th of September the first installment of guests were received there—some 19 in number.

The following officers were detailed by myself for duty at and in the neighborhood of Franklin, La., in addition to Surgeon Carter: Surg. P. C. Kalloch, Asst. Surg. R. H. von Ezdorf, and Acting Assistant Surgeons Faget and Ahrens. A hospital steward was also detailed for duty at this point.

Following is a detailed account of the measures taken by the Service in the suppression of the epidemic at Franklin, La., by Surg. P. C. Kalloch, who was in charge of quarantine matters at that point:

OFFICE OF MEDICAL OFFICER IN COMMAND.
MARINE-HOSPITAL SERVICE.

Cairo, Ill., November, 1893.

SIR: I have the honor to report the following transactions prior and subsequent to my taking command of quarantine measures at Franklin, St. Mary Parish, La., during the epidemic of yellow fever which occurred at that point during the present season.

Franklin is a town of 3,500 inhabitants on the Southern Pacific Railroad, about 100 miles west of New Orleans, and on the Bayou Teche.

The first recognized case of yellow fever occurred in the practice of Dr. B. W. Smith and, according to the clinical history kindly furnished by Dr. Smith, the case furnished nearly, if not quite, all the characteristic symptoms of yellow fever. The illness began on August 5, but the diagnosis was not established and the case reported to the health authorities until shortly prior to death, which ensued on the 10th of the same month. The parish health officer, Dr. Charles Smith, concurred in the diagnosis, and in accordance with the agreement of the Atlanta convention, reported the case at once to the State board of health, which immediately declared quarantine against the town.

Surg. H. R. Carter was at once called for consultation, and arrangements were made under his direction to prevent, if possible, the spread of the disease. The house and premises where Hopson died had, however, been visited by a great many persons, so that the prospect for preventing the spread was not the best. Thorough disinfection of this house and the premises was at once begun. Under Surgeon Carter's direction a cordon was established about the town to protect the remainder of the parish, and one-half the expense of maintaining this cordon was borne by the Service.

The wisdom of this measure was demonstrated by the result, not a case of yellow fever having occurred in the territory surrounding Franklin in the remaining two and one-half months of quarantine except in the direction of the Caffrey refinery, to which point, at the end of the epidemic, the disease spread by gradual progression.

A detention camp was also organized under Surgeon Carter's direction on the east side of the Bayou Teche, opposite Franklin. Four rough buildings were constructed of wood, one to be used as kitchen, one as disinfection room for clothing, and two as small wards in the hospital inclosure. Barbed-wire fence surrounded both camp and hospital and divided one from the other, a neutral ground being used for the inspection of suspicious cases of sickness occurring in camp. About 60 tents were used in constructing the original camp and hospital.

The camp was so arranged that the whites and negroes should have separate portions of the camp: men and women, of course, having separate quarters, and a few tents were set aside for families.

Water was supplied from Franklin artesian wells, being hauled daily in the city sprinkler. On account of the iron rust and sediment, Dr. Ahrons arranged a distilling apparatus for the water used in drinking.

Persons desiring to enter the camp were instructed to send a change of clothing for disinfection the day previous to admission. Upon entering, the disinfected clothes were put on in a tent outside the camp limits. Those worn to camp and any additional clothing being tagged and disinfected by formaldehyde.

Any cases of illness occurring in camp with symptoms suspicious were at once isolated, and if yellow fever were put in the hospital for such cases.

The number of persons admitted to camp and discharged to proceed to their destination was 168, and so far as is known no case of yellow fever occurred outside the camp through contact or communication with persons or articles from it. It was therefore perfectly successful and fulfilled the purpose for which it was intended.

For the purpose of preventing or checking the spread of yellow fever in Franklin the following measures were adopted:

An old wooden structure adjoining the store of Mr. Hopson, and thought to be a possible cause of infection on account of its proximity to premises infected last year, was burned by the advice of Surgeon Carter. A disinfecting gang was set to work in the neighborhood of Hopson's boarding place, and later in other portions of the town showing evidence of infection. By the 10th of September, however, it was evident that the spread would continue until frost, so that the disinfection of premises was continued with only the hope of retarding the spread and possibly lessening the virulence of the epidemic.

Over 600 cases were reported by the physicians as occurring in Franklin up to October 20. Of these only 10 proved fatal, showing the extreme mildness of the disease. Among those that recovered there were several cases of black vomit, temporary suppression of urine, and marked albuminuria. In some cases the jaundice was well marked, though in many cases this symptom was lacking. The negro population seemed to be affected only late in the epidemic, and their cases were extremely mild; many of them being able to get up on the second or third day and continue their occupations.

The disease spread at first by regular progression from house to house, there being, early in September, only two foci of infection. Some persons exposed in these localities, but living in other portions of the town, were taken with the disease, and finally a greater portion of the town became infected.

Of the fatal cases a large proportion proved so from either carelessness at the beginning of the attack, the patient or physician being uncertain as to the diagnosis and not realizing the importance of care and treatment, or from some indiscretion at the beginning of convalescence.

There were at first many self-constituted authorities who loudly proclaimed their opinions that the epidemic was not yellow fever, but many of these were converted by the insidious action of the disease germ on themselves, and amateur experts became less demonstrative and fewer in number as the season advanced.

As a protection to portions of the State outside Franklin, Dr. Charles Faget, of New Orleans, was employed by the Service as inspector, and his services in this direction were valuable. He was of still greater value to the physicians of Franklin (as a consultant), who gladly availed themselves of his diagnostic skill and experience in the treatment of yellow fever.

Asst. Surg. R. von Ezdorf was ordered to inspect territory outside of the quarantined area, and his service was conscientiously and thoroughly performed. On account of the opposition to the reception of refugees from Franklin detention camp (Camp Smith) at Morgan City, the first railroad station east of the quarantined parish of St. Mary, he was kept at that point for some time, and worked faithfully to convince the authorities of the injustice of their attitude, but was not entirely successful.

Toward the end of the epidemic, when it was found that many poor persons ill with fever in Franklin were suffering for proper attention and care, it was suggested by Temporary Acting Assistant Surgeon Percy Ahrons that a tent hospital be established near the site of the detention camp for the treatment of such cases. This plan being approved by Surgeon Carter and myself, a very comfortable hospital of 20 beds was opened by the Service, and about 35 persons took

advantage of its hospitality. Most of these were light cases of yellow fever, but in at least two of these cases only good treatment and excellent nursing saved the lives of the patients. The hospital was also a great boon to several poor families in which a number of persons were ill at the same time and suffering for the requisite help to insure recovery.

LIST OF OFFICERS AND EMPLOYEES AT FRANKLIN, LA.

Surg. P. C. Kalloch in command.

Detention camp and hospital.

Dr. Percy Ahrons, in charge of camp.

Dr. A. R. Hagen, in charge of hospital.

Mr. A. V. Sceals, custodian.

Mr. Charles Pabst, commissary.

Mr. Harry Halstead, disinfecter.

Trained nurses: Misses Bullard, Ferguson, and Norsdoff.

Captains of guard.....	4	Waiters.....	8
Guard.....	26	Laborers.....	10
Bugler.....	1	Messenger.....	1
Mechanic.....	1	Laundresses.....	2
Cooks.....	3	Attendants.....	4

In the town of Franklin.

Dr. Charles Faget, inspector and consultant.

Dr. B. W. Smith, sanitary inspector.

Dr. A. J. Smith, in charge of cordon.

Messrs. E. J. Thurston and E. B. Holsendorf, hospital stewards.

Mr. James B. Drury, sanitary inspector.

Mr. Cecil Champenois, in charge of disinfection.

Mail disinfecter.....	1
Disinfectors of dwellings.....	2
Laborers.....	10
Quarantine guard about infected area, average number.....	10
Quarantine guard about town paid by Service.....	25

In conclusion, I wish to express a feeling of gratitude to the physicians and authorities of Franklin, and especially the mayor, Mr. L. B. Tarlton, for their kind and courteous treatment of myself as representing the Marine-Hospital Service, and many acts of attention and kindness to me personally, on the part of these and other citizens of the town.

Respectfully, yours,

P. C. KALLOCH,

Surgeon M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

The disease continued to spread in the limits of the town of Franklin, in spite of all precautions, and between the 11th of August and the 20th of October—the dates of the first and last cases reported—there was a total of 607 cases of yellow fever and 9 deaths from this disease. The mortality rate for this outbreak at Franklin was, as calculated from these figures, but 1.48 per cent.

SPREAD OF THE FEVER IN LOUISIANA AND MISSISSIPPI.

There was no spread of the fever from McHenry, Miss., nor from Franklin, La., but on August 31 yellow fever was reported at Taylor, Miss., and after that date forty-six localities in the States of Louisiana and Mississippi were successively reported—twenty-one in Louisiana and twenty-five in Mississippi. There were no new foci of infection reported in either of these States after October 16. Frost was reported in Columbus, Starkville, Oxford, and Holly Springs, Miss., on October 13, and at Franklin and New Orleans, La., on October 17. Owing to the coldness of the season and the general appearance of frost the fever from this time declined rapidly, and the epidemic was practically at an end on November 1.

Up to about November 1 the record of the epidemic is as follows: Louisiana, 1,470 cases reported, 51 deaths; Mississippi, 1,008 cases reported, 63 deaths; total, 2,478 cases reported; 114 deaths.

The total mortality rate was 4.6 per cent, based upon the above figures. The mortality rate for the State of Mississippi was 6.25 per cent and for Louisiana 3.47 per cent.

This epidemic was characterized by the mild type of the disease. It will be recalled that the epidemic of the previous year, which itself was of a mild type, had a mortality rate of 10.4 per cent, there having been 3,584 cases in these same two States, with a total of 392 deaths. In the epidemic of 1898 the disease was confined to two States, there being fifty localities infected, while in 1897 it occurred in ten States, with forty-two localities infected.

I append herewith a table furnished by the Chief of the Weather Bureau, showing the dates upon which frost appeared in the infected districts in the fall of 1897 and 1898:

Dates of first frost of autumn, 1897 and 1898.

	1897.	1898.
Memphis, Tenn.:		
First light frost	Oct. 29	Oct. 18
First heavy frost	Nov. 3	.....
First killing frost	Nov. 17	Oct. 22
Vicksburg, Miss.:		
First light frost	Sept. 22	Oct. 18
First killing frost	Nov. 17	Oct. 27
Jackson, Miss.:		
First frost	Oct. 30	Oct. 18
First heavy frost	Nov. 3	.....
First killing frost	Nov. 17	Oct. 22
Natchez, Miss.:		
First killing frost	Nov. 30	(a)
New Orleans, La.:		
First light frost	Nov. 18	Oct. 22
First killing frost	Dec. 5	Oct. 27

a Natchez, Miss., no record of frost. The temperature fell to 36° during the night of October 22, 1898, and to 30° during the night of October 27, 1898.

The following table contains a list of all places infected, with dates of first and last cases, as reported, and total cases and deaths:

Tabulated statement of localities infected with yellow fever, 1898.

Locality.	Date of first case reported.	Date of last case reported.	Total cases.	Total deaths.
LOUISIANA.				
Alexandria.....	Oct. 6	Oct. 15	200	2
Amite City.....	Oct. 13	Oct. 15	1	1
Baton Rouge <i>a</i>	Sept. 25	Oct. 15	176	4
Bowie.....	Oct. 6	Oct. 6	1	0
Cinclare.....	Oct. 15	Oct. 15	11	1
Deligny.....	Oct. 1	Oct. 1	1	0
Feliciana.....	Oct. 17	Oct. 17	(<i>b</i>)	—
Franklin.....	Aug. 11	Oct. 20	607	9
Harveys Canal.....	Sept. 24	Oct. 6	14	3
Houma.....	Sept. 23	Oct. 15	40	2
Iberville.....	Oct. 17	Oct. 17	(<i>c</i>)	—
Jackson.....	Oct. 15	Oct. 15	15	0
Jefferson Parish.....	Sept. 20	Sept. 20	5	0
Lake Charles.....	Oct. 10	Oct. 15	1	0
Lobdell.....	Oct. 12	Oct. 12	(<i>c</i>)	—
Lutcher.....	Oct. 15	Oct. 15	14	2
New Orleans.....	Sept. 17	Oct. 15	74	19
Plaquemine.....	Oct. 1	Oct. 15	6	1
St. Charles Parish.....	Oct. 4	Oct. 4	(<i>c</i>)	—
St. James Parish.....	Oct. 1	Oct. 1	1	0
Wilson.....	Sept. 26	Oct. 15	303	7
Total.....			1,470	51
MISSISSIPPI.				
Canton.....	Oct. 10	Oct. 26	9	0
Clinton.....	Oct. 8	Oct. 15	40	0
Crystalsprings.....	Oct. 11	Oct. 21	7	0
Edwards and vicinity.....	Sept. 27	Oct. 16	12	1
Eucutta.....	June 24	June 24	1	0
Fayette.....	Oct. 6	Oct. 13	5	0
Harriston.....	Oct. 6	Oct. 30	134	8
Hattiesburg.....	Oct. 8	Oct. 21	35	3
Hermanville.....	Oct. 6	Oct. 13	3	0
Jackson.....	Sept. 10	Nov. 10	208	11
McHenry.....	June 9	June 29	22	0
Madison and vicinity.....	Oct. 6	Nov. 10	95	1
Meridian.....	Oct. 15	Oct. 17	3	0
Natchez.....	Oct. 7	Nov. 2	37	4
Orwood.....	Aug. 31	Oct. 27	100	5
Oxford.....	Sept. 21	Oct. 27	86	12
Poplarville.....	Oct. 9	Oct. 18	24	1
Port Gibson.....	Oct. 6	Oct. 6	1	1
Queen Hill.....	Oct. 15	Oct. 15	1	1
Ridgeland.....	Oct. 8	Oct. 17	7	0
Starkville.....	Oct. 6	Oct. 18	9	0
Taylor's.....	Aug. 31	Oct. 21	106	14
Tougaaloo.....	Oct. 16	Oct. 17	2	0
Waterford.....	Sept. 9	Oct. 6	2	0
Water Valley.....	Sept. 7	Oct. 21	12	0
Waveland.....	Oct. 10	Oct. 18	20	1
Woodville.....	Oct. 6	Oct. 6	1	0
Yazoo City.....	Oct. 16	Nov. 10	26	0
Total.....			1,008	63
Total for epidemic.....			2,478	114

a Yellow fever reported—cases and deaths not given—on October 17, 1898, from East and West Baton Rouge.

b Yellow fever reported—cases and deaths not given—in East and West Feliciana.

c Yellow fever reported in this locality. Cases and deaths not given.

In studying the spread of the disease it should be stated that the dates on which it was *reported* in the several localities, as indicated in the above table, do not correctly indicate the time when the localities became infected, since it was found on investigation that the disease

had been prevailing, in nearly every instance, a considerable time before reported. In the following table, prepared by Surgeon Carter, the principal localities infected are arranged in the order of the date of their infection, this date having been determined generally by the local health officer, the disease having been so mild in character that at first the cases were not recognized. If we exclude McHenry, which is a separate matter, we find that there is but one town in Mississippi that was infected in July, namely, Taylor, on July 20; while in Louisiana there were two localities known to be infected in July, namely, Plaquemine, July 10, and Harveys Canal the latter part of July.

Regarding New Orleans it should be observed that no data, official or otherwise, are obtainable showing how long the disease had been prevalent prior to September 17, when it was first officially announced.

Table showing localities infected, arranged in order of date of infection.

State and locality.	Real date of appearance.	Date when reported.
LOUISIANA.		
New Orleans.....	(?)	Sept. 17, 1898
Plaquemine.....	July 10-11, '98	Oct. 1, 1898
Harveys Canal.....	July —, 1898	Sept. 19, 1898
Lutcher.....	Aug. 5, 1898	Sept. 1, 1898
Franklin.....	Aug. 6, 1898	Aug. 11, 1898
Houma.....	Aug. —, 1898	Sept. 25, 1898
Wilson.....	Aug. 8, 1898	Sept. 24, 1898
Alexandria.....	Aug. 10, 1898	Oct. 6, 1898
Baton Rouge.....	Aug. 29, 1898	Sept. 24, 1898
MISSISSIPPI.		
McHenry.....	May 19, 1898	<i>a</i> June 9, 1898
Taylor.....	July 20, 1898	Aug. 31, 1898
Orwood.....	Aug. 1-10, '98	Aug. 31, 1898
Jackson.....	Aug. 18-25, '98	Sept. 10, 1898
Madison Station.....	Aug. 18-25, '98	Oct. 7, 1898
Harriston.....	Aug. 25-30, '98	Oct. 1, 1898
Hattiesburg.....	Sept. 9, 1898	Sept. 9, 1898
Poplarville.....	Sept. 12, 1898	Oct. 9, 1898
Oxford and Water Valley.....	(<i>b</i>)	Oct. 7, 1898

a "Stamped out" by July 8, 1898.

b Traced to Orwood and Taylor.

The above table indicates that Louisiana was infected before Mississippi, and the report of P. A. Surg. J. O. Cobb on "The source of yellow-fever infection in Mississippi in 1898" demonstrates that the disease at Taylor, the first place infected in Mississippi, was traceable to New Orleans.

The spread of the disease, as reported to the Bureau, and the general operations of the Service in connection therewith, are detailed in the following weekly summary for September and October:

WEEKLY STATEMENT OF THE SPREAD OF THE DISEASE, AS REPORTED, AND MEASURES TAKEN BY THE SERVICE DURING SEPTEMBER AND OCTOBER.

SEPTEMBER 1-8, 1898.

The first week in September saw new localities involved in the outbreak. Investigation of suspicious cases of fever at Orwood, Miss. (which were reported to the Bureau as suspicious by the State board

of health of Mississippi on the last day of August), proved that the cases were without doubt yellow fever, and investigation also showed that the disease had been existing in the town some weeks, there having been in all a total of 35 cases up to September 4. No deaths had occurred. The origin of the cases at Orwood was traced to Taylor, a town on the Illinois Central Railroad, where it was afterwards found that 5 cases of yellow fever had developed as early in the summer as July 20. Two of these cases had moved to Orwood and had spread the infection.

Investigation at Taylor, Miss., by Surgeon Carter, showed a similar state of affairs. Reports received from there on the 7th show that there had been cases at Taylor in 7 houses in that place, and reports up to the 9th show a total of 23 cases, of which 2 were fatal.

In both these newly infected localities—or rather localities newly reported to be infected—all precautions to prevent further spread of the disease were at once put into operation, but the infection had been too widely spread for such action to be successful.

In order to carry such sanitary measures into effect I had, previously to the period mentioned, ordered additional officers of the Service to important points in Mississippi and Louisiana, their disposition at this time being as follows:

Surgeon Carter and Passed Assistant Surgeon Cobb were at Taylor and Orwood, cooperating with the Mississippi State board of health; Passed Assistant Surgeon Stimpson had been ordered to Holly Springs to take charge of railroad inspection on the Kansas City, Memphis and Birmingham Railroad, being aided in this work by Acting Assistant Surgeons Frick and Laundry. In addition, Passed Assistant Surgeon McIntosh was awaiting orders at Grand Junction.

SEPTEMBER 8-15, 1898.

The second week of September developed still further reports of the disease, which continued to be of an extremely mild type, very few fatalities being reported. The secretary of the Mississippi State board of health reported on September 10: "One case of yellow fever in Jackson, Miss. Thoroughly cordoned for four blocks, with another cordon on the outside of this."

Waterford, Miss., was reported to have a case of yellow fever on the 9th, while investigation by Surgeon Carter of reported cases at Water Valley proved the report to be unfounded.

At the previously infected localities cases still continue to occur, Franklin reporting to September 14 a total of 42 cases and 2 deaths, and Taylor, as stated above, showing to the 9th of September a total of 23 cases, with only 2 fatalities. At Orwood, to the 6th, there had been 41 cases, with no deaths.

During this week Surgeon Carter arranged for train-inspection service on all passenger trains out of Jackson. Passed Assistant

Surgeon Cobb was ordered to assume charge of affairs at Taylor, being aided by Acting Assistant Surgeon Lanier, and Acting Assistant Surgeon Landry was put in charge of the infected premises at Waterford, while at Grand Junction, Tenn., Passed Assistant Surgeon McIntosh was directed to establish and maintain an inspection and relay station for the crews of freight trains on the Illinois Central Railroad. The location of this station was about 4 miles out of Grand Junction, on this railroad.

SEPTEMBER 15-22, 1898.

The report of cases and deaths occurring during this outbreak, up to September 22, shows that during the third week of September cases occurred at the following new points: Houma, La., case reported September 17; New Orleans, 1 case reported September 17, 2 cases on the 20th, 1 case on the 21st, and Oxford, Miss., from which place a report was received on the 21st of September from Dr. Haralson, of the State board of health of Mississippi, announcing the finding of cases there. He wired as follows: "Five cases of yellow fever here under treatment; 1 death; exposure to infection has been general."

SEPTEMBER 22-30, 1898.

From this date until the 1st of October yellow fever appeared to spread slowly, new cases being reported from previously infected localities and new localities being reported throughout Louisiana and Mississippi. The case reported at New Orleans September 17 was in all probability not the first case by any means, and later developments point to the occurrence of many more cases in that city than were reported. Between this time and the end of the month the fever was announced from Franklin, New Orleans, Baton Rouge, Harvey's Canal, Wilson, Houma, Plaquemine, and Delogny, in Louisiana, and Jackson, Orwood, Oxford, Taylor, Edwards, Water Valley, and Waterford, in Mississippi.

In order to prevent the introduction of the fever at points in the affected States as yet uninfected, as well as to prevent its introduction into other States, a thorough system of train inspection was organized and put into operation.

TRAIN-INSPECTION SERVICE.

The following extracts from the public health reports of September 23 and 30 show the apportionment of officers of this Service to the railroad-inspection service, and also the names of the railroads inspected, as well as the runs of the inspectors:

Passed Assistant Surgeon McIntosh, at Jackson, Tenn., in charge of the inspection service over the Mobile and Ohio, from Union City, Tenn., to Corinth, Miss., and over Illinois Central from Fulton, Ky., to Holly Springs, Miss., for the protection of West Tennessee.

Passed Assistant Surgeon Stimpson to supervise the work of inspectors in

Mississippi on the Illinois Central, Alabama and Vicksburg, Jackson and Natchez Branch of the Yazoo Valley on the Yazoo and Mississippi Valley Railroad from Vicksburg to Slaughter, La., and Kansas City, Memphis and Birmingham.

Passed Assistant Surgeon Stoner was ordered to Atlanta in connection with the disinfection of coaches used for refugees. Autoclaves and a supply of disinfectants were sent to Atlanta for this purpose.

Assistant Surgeon Cumming was ordered, September 21, to Chattanooga, to organize an inspection service on all trains entering Chattanooga from the south, the preliminary arrangements of which had been made by Acting Assistant Surgeon Hunt.

Railroads inspected and "runs" of the inspectors.

Yazoo and Mississippi Valley Railway: Inspected south of Vicksburg. Inspector running from Vicksburg, Miss., to Slaughter, La. Connecting roads to the north being covered, inspection of this road north of Vicksburg is not necessary.

Jackson and Natchez Branch: Under inspection by the Mississippi State board in cooperation with the service. Inspectors run from Harrison to McRaven.

Jackson and Yazoo City Branch: Inspected in the same way. Inspectors run from Flora to Yazoo City.

Alabama and Vicksburg Railway: Inspected from Meridian to Vicksburg both ways.

Southern Railway: From West Point to Greenville. All trains abandoned.

Kansas City, Memphis and Birmingham: Only one train a day now running. Inspected both ways from Memphis to the meeting point of trains just beyond the Alabama line.

Illinois Central: Inspected under supervision of the service from New Orleans to Asylum switch.

On the Memphis Branch: From Canton to Relay Station just north of Memphis, the inspection was partly in the hands of the Service and partly in the hands of the State inspectors cooperating with the Service. From the Memphis Relay Station north to Fulton, all trains inspected by the Service.

On the Jackson and Grand Junction Line: All trains inspected from Fulton to Holly Springs. No trains running between Grenada and Holly Springs.

Mobile and Ohio: Inspected from Union City, Tenn., on the north to Alabama State line.

Nashville, Chattanooga and St. Louis: Inspected from Paris, Tenn., to Whiteville, Tenn.

Louisville and Nashville: From just east of Tennessee River to Humboldt, these last two inspections were for the purpose of arresting the return of refugees who are attempting to double.

All roads entering Chattanooga from the south and southwest were inspected.

Memphis and Charleston: All trains from Chattanooga to Decatur, Ala.

Alabama and Great Southern: Chattanooga to Birmingham.

Atlanta and West Point, Western Atlantic and Georgia Division of the Southern, to meeting point of trains.

New Orleans and Northeastern: Inspected from New Orleans to Alabama State line.

In addition, the branch of the Southern, from Meridian to Alabama State line, was also inspected.

OCTOBER 1-8, 1898.

During the first week in October the disease appeared to spread slowly but steadily, and the following localities in Mississippi and Louisiana were reported during this time to be newly discovered

centers of infection: Bowie, Delogny, Plaquemine, and St. James Parish in Louisiana; and Clinton, Fayette, Harriston, Hermannville, Madison, Port Gibson, Starkville, and Wardville in Mississippi. At the majority of these localities there were only two or three cases, and consequently no great alarm was felt, as the date of probable frost was at this time near at hand.

STARKVILLE, MISS.

The outbreak at Starkville, Miss., occurred at the A. and M. College, in that town, and in all 9 cases occurred. Following is the report of the officer ordered to investigate the report of fever there and to aid in its treatment and extermination:

STARKVILLE, MISS., *October 18, 1898.*

SIR: I have the honor to report that in obedience to instructions from Surgeon Murray, I proceeded, October 15, from Mobile, Ala., to the A. and M. College, Miss., to aid in the treatment and extermination of yellow fever at this place. I arrived here on the morning of the 16th instant, and found that the college and local health authorities had taken thorough precautions to limit the spread of the disease. An efficient cordon of guards under the direction of General S. D. Lee, the president of the college, assured no escape from the infected area, and all suspects were isolated and made to serve a detention of ten days. There has been a total of 9 cases of yellow fever within the college grounds since September 28. The last case developed on yesterday morning, and was discovered after I made my telegraphic report yesterday. This patient's name is R. C. Nickles. He is a student here and was roommate of the last case preceding. There are yet 18 suspects under the ten days' detention.

A decided frost occurred here this morning. All patients have recovered except three, and these are doing well. The fever here is of a mild type.

Very respectfully, your obedient servant,

G. H. FONDE,

Acting Assistant Surgeon, U. S. M. H. S.

Train-inspection service was continued on the majority of lines, the only changes being these:

All trains on the Yazoo and Mississippi Railroad were suspended. Inspection on the Memphis and Charleston Railroad was extended to include the entire work; also on the Nashville, Chattanooga and St. Louis to include the greater part of that road.

Inspectors were placed on the Louisville and Nashville Railroad from Memphis to Guthrie.

WEEK ENDED OCTOBER 12, 1898.

During the week ended on the 12th of October, these new centers of infection in Mississippi and Louisiana were announced. In Mississippi: Bay St. Louis, Canton, Crystal Spring, Hattiesburg, Natchez, Poplarville, Ridgeland, and Waveland; while in Louisiana there were the following new centers: Alexandria, Lake Charles, Lobdell, and Amite City. Two officers of the Service at this time developed yellow fever, one at Taylors and the other at Orwood, but both recovered.

The detention camps which were established for the accommodation of those wishing to leave the various infected places were at this time in good working order and were receiving guests. Passed Assistant Surgeon Cobb, who laid out and erected the refugee camp at Oxford, Miss., reported 320 people in this camp; and reports from the detention camp near Franklin indicated that a fair number of persons were making use of it.

On the 12th of October the following telegram was received from Surgeon Carter, at New Orleans, partially summarizing the operations of the Service and the fever conditions during this week:

[Telegram.]

NEW ORLEANS, *October 12, 1898.*

October 6. Yellow fever declared at Alexandria; quite general in part of town; existed about five weeks; very mild type.

October 7. Removed relay on valley road to Grayden, La., place being infected territory.

October 8. Clarke goes to Alexandria to instruct in disinfection and quarantine. Yellow fever announced at Hattiesburg; believed to be from Jackson, Miss.; about four weeks old, moderate type, said to be confined to small district. Cordoned, and a physician placed inside to attend sick, hoping to delay spread of fever till frost. Sent 2 physicians and 6 nurses to Wilson, where everybody is down.

October 9. Fever announced at Lumberton. Guard put on railroad at Moxie to protect Gulf and Ship Island Railroad from Lumberton. Place quarantined.

October 10. Fever reported at Canton, Miss. Came from Madison by negroes. Carter goes to Jackson to confer with Mississippi board of health. Service will cordon infected district of fever till frost. Removed such inspectors as are not needed on the Illinois Central Railroad. Stationed physicians at relay camp of Illinois Central Railroad for diagnosis.

October 11. Health Officer Saunders telegraphed from Montgomery, Ala.:

"Entire States of Mississippi and Louisiana placed under quarantine. Will instruct officers not to permit persons from those States to stop in Alabama. Refugees may pass through in locked and guarded coaches or trains."

The train-inspection service was modified during this week as follows:

All trains discontinued on Yazoo and Mississippi Valley Railroad from New Orleans to Vicksburg. Inspection on the Illinois Central south of Canton was discontinued.

In order to carry out the Alabama quarantine against Mississippi and Louisiana, the inspection was extended over the Southern, Georgia Pacific, and Alabama and Great Southern Railroad to Birmingham and Montgomery. Passed Assistant Surgeon Oakley was ordered to Birmingham in connection with this extension of inspection, and Surgeon Glennan, at Atlanta, put inspectors on the roads entering Alabama on the east, not already included, to complete the control of all passengers through the State of Alabama.

OCTOBER 13-20, 1898.

During this week light frosts occurred at a number of localities in Mississippi and Louisiana, and the weather generally was reported as being so cool that, except in the extreme South, it was improbable that new foci of infection would be formed. In the early part of the week, however, these localities in Louisiana were reported as new centers of infection: Cinclare, Iberville, East and West Feliciana, Litcher, and St. Charles Parish.

As a matter of record, the dates of frost in localities in the States of Mississippi and Louisiana are here given: Frost was reported in Columbus, Starkville, Oxford, and Holly Springs, Miss., on the night of the 13th of October, and four days later at Franklin, La., and at New Orleans.

All quarantines by the State board of health between New Orleans and infected points in Louisiana were raised on the 12th of October, and on the 20th the quarantine established by the State board of health of Tennessee was raised, to go into effect the following day.

Train-inspection service during this week was much contracted. All inspectors were withdrawn from the roads centering at Chattanooga, viz, Atlanta and West Point, Southern, Western and Atlantic, Alabama and Great Southern, and Memphis and Charleston; also from the following additional roads in northern Alabama, viz, Southern, Georgia Pacific, and Louisville and Nashville.

The inspectors were also withdrawn from the roads entering or traversing western Tennessee, viz, Illinois Central, Kansas City, Memphis and Birmingham, Louisville and Nashville, Memphis and Charleston, Mobile and Ohio, and Nashville, Chattanooga and St. Louis. The inspection stations hitherto maintained, for the inspection of the crews of steamboats from New Orleans at the mouth of the Red River and near Vicksburg, were discontinued.

The disinfection of freight at Jackson, Miss., was also suspended.

Surgeon Carter reports on the work of the week in the following terms:

NEW ORLEANS, LA., *October 18, 1898.*

SIR: I have the honor to submit the following report of the work done in this vicinity since my last report, October 12, 1898:

October 13. Camp Hutton opened; P. A. Surg. G. M. Magruder in command, Asst. Surg. C. H. Lavinder and Acting Assistant Ahrens with him.

October 14. Surgeon Carter at Oxford, in conference with Surgeon Murray and Passed Assistant Surgeon Cobb, is inspecting the work there. Von Ezdorf seems, from the temperature chart, to have had a relapse of yellow fever; doing well. Agreed to stop disinfection at Orwood and (save a few houses) at Taylors, as unnecessary. The few foci at Water Valley and those in Oxford will be treated. Have had light frost here.

October 16. Assistant Surgeon Cummings finished work at Jackson, Miss.; that is, cordon around infected portion of city. He goes to Oxford to assist Passed Assistant Surgeon Cobb. Surgeon Carter goes to Meridian on request of State board of health of Meridian to examine cases of suspicious fever.

October 17. Surgeons Murray and Carter examine 2 cases in question and find them yellow fever. Board of health believe infection from Hattiesburg. Weather is so cold that new foci will not establish in Meridian.

October 18. Great need of relief measures at Poplarville, Clinton, and Madison. Surgeon Murray stays two days in Meridian. Carter returns to New Orleans. The weather now is cold enough (save possibly in the extreme South) for us to expect no new foci to be formed. New cases will, of course, develop from exposure to foci already established, but no new foci of infection will be established by these cases.

H. R. CARTER.

Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

OCTOBER 20-28, 1898.

There were no new foci of infection reported in either of the States in question after October 16.

Owing to the coldness of the season and the general occurrence of frosts in Mississippi and Louisiana, the fever declined rapidly, and although at this date, November 1, 1898, there are still a few cases occurring in the various localities where it had previously made its appearance, the outbreak is virtually over and all danger of its spread is at an end.

Train-inspection service was altogether abolished by the end of October, except between Montgomery, Ala., and Atlanta, Ga., and at Flomaton, at which places it was still continued, owing to the amount of military and civilian travel from New Orleans to Jackson via these points.

All quarantines against New Orleans were also raised by the end of October, except those maintained by the States of Florida and Texas.

SERVICE MEASURES FOR THE SUPPRESSION OF THE EPIDEMIC.

The details of Service operations in the South during this epidemic may be found in the reports of the officers included in this annual report. Of necessity other detailed reports than those herein published must be deferred until the next annual report. In general, however, it may be stated that experienced officers were placed in charge of well-defined territories to see that the Treasury regulations were being enforced, aiding the local health authorities, or when necessary, assuming charge themselves. It may be stated that there was no friction with any of the State or local authorities, all working in unison. In Louisiana, in addition to the cordon and detention camp established at Franklin, Camp Hutton, established at Avondale in the previous year, was reopened this year for the protection of the sugar plantations, those going from New Orleans to work on the plantations being obliged to pass through this camp. The Service also furnished the equipment for, laid out and established, a probation camp at Oxford, Miss., where it had been determined by the

State authorities that depopulation of the infected portion of the city was desirable. Pressure was brought to bear upon the Service to take entire charge of the people in the probation camp and to feed them, but this was refused. A number of small camps in connection with the train-inspection service were established, the supplies being drawn from Camp Fontainebleau.

Under Surg. H. R. Carter in New Orleans a complete system of inspection and disinfection of outgoing freight in accordance with the Marine-Hospital Service classification was carried on; train-inspection service out of New Orleans was inaugurated, and also inspection of vessels before departure. A steamboat-inspection service near the mouth of the Red River and another at Vicksburg, Miss., were established.

Surveillance over travel was maintained at New Orleans in accordance with the regulations, and, as supplemental thereto, an officer was stationed at Atlanta, Ga., a great distributing point of the South, to see that persons having left New Orleans on the through trains to Atlanta should not secure passage on trains bound for any points south of Atlanta until after ten days' absence from any infected point. The railroad agents in Atlanta refused to sell tickets for the South without a proper certificate from the Marine-Hospital officer. A train-inspection service, in addition to the one out of New Orleans, was established in northern Mississippi, western Tennessee, and at Chattanooga. While a full report upon the train-inspection service has not yet been prepared, it is deemed advisable, as illustrative of the character of the service, to insert here the directions to the train inspectors issued by Surg. H. R. Carter, whose headquarters were at New Orleans, and P. A. Surg. W. G. Stimpson, whose headquarters were at Fulton, Ky., but who personally inspected the work of the inspectors employed by himself.

DIRECTIONS FOR TRAIN INSPECTORS.

The object of your inspection is to keep people from traveling who have been in any infected district within ten days.

In general, you will require a health certificate from each passenger boarding your train between Osyka and Canton. This certificate must be (1) signed by a health officer; (2) must certify to his knowledge that the holder has not been within the past ten days in any place quarantined by the State board—a copy of the places and districts quarantined will be furnished you; (3) has a personal description of the holder sufficient to identify him. You will use all reasonable pains to satisfy yourself of the identity of the person holding the certificate and that the facts set forth therein are correct. The mere holding of a certificate is not proof of right to hold it: and if you are sure that anyone holding a certificate, even if in proper form, has been within ten days in a place quarantined by the State board, you will act as if he had no certificate; similarly in cases in which the certificate is not altogether of the required form, and yet you are convinced from other evidence that the person is entitled to one—i. e., has not been in any place quarantined by the State board—you should pass the holder as if the certificate were all right. An examination of dates of stamps on letters received, order

books of drummers, receipts of hotel bills, etc., will frequently allow you to determine where the man has been for the past ten days. In the first case you should indorse the certificate as "Fraudulent," sign your name, and give date.

As far as possible, without delaying the train, see if the person has a certificate as he boards the train; and if not, direct the conductor not to allow him aboard. In case you find a person aboard a train who is not entitled to a health certificate, who is too far from his station to be put off, you will direct the conductor to take him to the guard tent, and hand him over to the guard, and on your return trip take him back to the place he got on.

In case of doubt, telegraph ahead to the health officer of the town at the end of your run, and turn the man over to him, taking your orders from him.

The doors and windows of the train must be kept closed passing through Jackson, and there must be no stopping of the train within the quarantine limits.

The conductor of the train has the authority of a police officer, and is instructed to assist you in carrying out these orders.

Always be polite and considerate of passengers, and assist them in every way possible.

You will keep a record of your inspection, on a blank to be shortly sent you, one copy to be kept by yourself and one mailed to me here.

H. R. CARTER,
Surgeon, U. S. M. H. S.

DIRECTIONS TO TRAIN INSPECTORS.

UNITED STATES MARINE-HOSPITAL SERVICE.

Fulton, Ky., October 5, 1898.

SIR: An amended copy of the instructions under which you are working is inclosed. Where your instructions read "within the past ten days in any place quarantined by the State board," you are to substitute the words "within the past ten days in any infected places."

The object of your inspection is to carry out the national quarantine regulations, primarily, and, secondarily, to cooperate with the State board in the carrying out of its regulations. If the regulations of the State board are at variance with the national regulations it is your duty to enforce the national in preference to the State regulations. For instance, the county or State may forbid the admission of people from certain localities which the Service does not hold to be infected, in which event there would be no justification for the Service assisting in restricting the movements of passengers from such places. Similarly, the localities may desire to impose restrictions which the Service considers to be unnecessary and unreasonable against the transfer at such places from one train to another of passengers from infected places. Under such circumstances you should decline to render the aid of the Service in the enforcement of such unwarranted regulations. At the same time you should, if possible, gain the confidence of the people in the towns through which your train passes and endeavor to prove to them that you have their interests at heart and will protect them from all danger.

Section No. 4, beginning "In case of doubt, telegraph ahead," should be omitted, as under no circumstances should the inspectors of the national service take orders from local health officers. If you have a passenger on your train from an infected place or one whom you have reason to believe has recently been in an infected place, it is your duty to prevent this passenger from debarking at any uninfected place in Mississippi or Tennessee, even though the people at the place of his destination do not object to his doing so. It is not sufficient for you to

turn such a man over to the local health authorities for them to do as they please with him; you must see that he is taken into uninfectible territory.

You must accept no health certificates from Cairo, Fulton, Chicago, or any place north of Tennessee unless there is other evidence to corroborate what the health certificate states. If the passenger from these places has no letters, telegrams, pass books, or other evidence to show that he has not been in infected places the previous ten days, he must not be allowed to get off the train in any place in Tennessee or Mississippi. Such a passenger should be kept off the train, or, if he is already on, he should be put off before the train reaches Tennessee or carried to the place where the north-bound train is met, placed on this train, and sent back beyond Tennessee. The conductors on your train have been notified by bulletin from the office of the superintendent of the railroad to keep all doors of cars in passenger trains locked, except when necessary to open them, while passing through Mississippi and Tennessee, and they have been informed that you are the one to decide if a passenger is from an infected district, and who shall be allowed to get off and on the train. If any conductor will not do as you wish in these matters, you must immediately inform me, giving names and full particulars.

You should not act harshly in the cases of women, children, old persons, and the like. Such cases are not to be left on the wayside unprotected; they should be carried through beyond infectible territory unless adequate provisions can be made for their care.

Your chief duty is the inspection of passengers, and if the train is crowded you should attend to this duty first and write out your report on the blanks furnished you afterwards, putting down as many names as you have time. You should always, however, place on your report the names of persons who have no certificates or unsatisfactory ones, and you should note in the margin what disposition you make of these cases.

There is very little danger in purely local travel in uninfected districts, so the inspector must not be too strict with persons desiring to go from one station to a few stations beyond. In such cases, if the passenger is vouched for by the ticket agent, conductor, or other responsible person, he may be allowed to go on the train even though he has no papers.

Each inspector must be at the railroad station at least twenty minutes before the train leaves.

WM. G. STIMPSON.

Passed Assistant Surgeon, U. S. M. H. S.

The following instructions were issued by the Bureau relative to the disinfection of railway coaches:

DIRECTIONS FOR THE DISINFECTION OF RAILWAY COACHES.

I.—For the day coach, dining car, tourist sleeper, parlor car.

Formaldehyde gas, applied by means of an autoclave in a 2 per cent per volume strength, the time of exposure not less than twelve hours.

II.—For Pullman, Wagner, and other sleeping cars.

Formaldehyde gas, applied by means of an autoclave at a 4 per cent per volume strength, the time of exposure not less than twelve hours.

Exterior of cars liable to convey infection should, after mechanical cleansing, be disinfected by (a) solutions of bichloride of mercury, 1:1,000; (b) solutions of carbolic acid, 1:40, or trikresol, 1:100.

Arrangement of the day coach for disinfection.

All openings of the car should be closed as tightly as possible, especially the ventilators: these are best closed by means of waste. All carpets along the aisles should be laid across the top of the seats. If the car is provided with sash curtains they should be pulled down and hooked over the windows. The cushions of the seats should be shoved slightly away from the backs so that all the surfaces can be reached by the gas.

Water-closets, lockers, and storeroom should be opened, all apertures to be closed with waste or some other similar material. The gas should be introduced into the car by one of two ways:

By the keyhole in the car door or through the hopper of the water-closet. If the car is badly infected it is always best to give a preliminary disinfection before doing all that has been outlined in the above.

Under these conditions the car is left just as it is, apertures closed, and a strong percentage of gas thrown in and allowed to remain for at least six to eight hours before it is arranged for the final disinfection. This procedure will be sufficient to sterilize the contents and surface of the car and renders this arrangement less dangerous to the operator.

The immigration coach.

If the coach is constructed with a view to easy closing, the interior can be given a cleaning with formaldehyde gas in not less than a 2 per cent per volume strength, and after this a mechanical cleansing of the floors and water-closets, to be followed by a thorough douching with a strong disinfecting solution, preferably a solution of bichloride of mercury.

Sleeping cars.

The same general rules apply to these as for the day and immigration coach. The berths must be let down, all pillows taken down from under the seats, the mattresses and pillows so arranged that all surfaces may be thoroughly exposed, curtains suspended from the curtain poles, the carpets removed from their fastenings and placed over the backs of the seats or suspended by some means in the aisle, the lockers, closets, etc., to be opened. All the articles therein to be arranged so as to be exposed to the gas. Articles of food, not hermetically sealed, should, after the completion of the disinfection, that is, after the exposure of the goods, be destroyed.

Water tanks should be disinfected either by a solution of formaldehyde 1:2,000 for two hours, or by permanganate of potash 1:20 for two hours, and afterwards thoroughly rinsed. In most cases it may be necessary to neutralize the formaldehyde gas by ammonia. This can be readily done by sprinkling a sufficient quantity on the floor of the car and allowing it to remain about one hour; about twice the quantity of ammonia should be used for the formaldehyde solution.

Sulphur is not recommended on account of the destructive effect upon fabrics.

In concluding this portion of the report I have to state that while there was some panic, particularly at Jackson and Oxford, Miss., in general the alarm and interruption to train service on railroads was inconsiderable as compared with that of the season of 1897. While train traffic was interrupted, and some trains were discontinued, this was the result of the falling off of business and not due to shotgun quarantine, nor was there any shotgun interruption of through passenger traffic.

With a view to tracing the infection in Mississippi to its source, Passed Assistant-Surgeon Cobb was specially detailed for this duty, and Acting Assistant-Surgeon Waldaner was detailed to assist him.

Following is the report of P. A. Surg. J. O. Cobb, to which reference has previously been made:

SOURCE OF YELLOW FEVER INFECTION IN MISSISSIPPI IN 1898.

By P. A. Surg. J. O. COBB.

On August 27 Dr. H. A. Gant, of the Mississippi State board of health, was called in consultation to see a seriously sick man who lived about 6 miles west of Taylors and 10 miles from Water Valley, which is Dr. Gant's home. Immediately upon seeing the case Dr. Gant's great experience enabled him to make a positive diagnosis of yellow fever at once, although at that time no source of infection could be traced or located. The flower of the experts of the State board of health, together with Surg. Henry R. Carter, of this Service, were almost immediately on the field. This was not the first case, and the gentlemen looking into the matter very soon discovered other cases, and the fact that two patients had already died—a brother of the first-discovered case and a young man living near by, and both in Taylors. The first suspicion of yellow fever was a diagnosis as early as August 18, made by Dr. J. M. Baird, of Oxford, Miss., on a child of the section boss of the Illinois Central Railroad, who lived at Taylors. Dr. Baird had intended looking into the matter more fully, but other duties prevented at the time, and he did not return to see the case. He had had experience in yellow fever in 1878, and would probably have announced yellow fever if he had gone to see the case a second time.

Now, by a simple and even primitive knowledge of the disease, keeping in mind the lapse of time necessary for secondary infection, familiarity with incubation periods and methods of spread by exposure, we can go in our imagination to the bedside of the first fatal case, the case of Dr. A. S. Gray, and see the disease in all its classical variations. We can be as sure that he died of yellow fever as we are sure that others died of the disease who had been exposed to his house and to him.

Men of undoubted honesty and ability saw the disease in the beginning, and have seen it from time to time during its course, and know that the disease was undoubtedly yellow fever. It therefore seems unreasonable to think of anyone in his senses declaring that there was no yellow fever in north Mississippi. Such, however, is a fact.

FIRST INFECTED POINT.

The first case of yellow fever in north Mississippi was in Taylors, as will probably be admitted by all. The other towns were infected from Taylors, as is well shown by Dr. Waldaner's diagram, which is embodied in his report.

HISTORY OF FIRST CASES.

The first deaths were Dr. A. S. Gray, August 9, and Hampton Williams, August 10. Now, then, we know that these two men did not contract the disease one from the other. We know that the disease is not contracted merely from one person to another without the interval of time necessary to establish secondary infection. Dr. Gray and young Williams probably were exposed to a common focus, for both men were taken sick at the same time, dying within a day of each other. We shall attempt to show this common focus, and show the method of spread from the first cases in Taylors to the adjoining towns.

Dr. Gray's family consisted of his wife and four small boys. At his house there were visiting Mrs. Anna F. Wilkins and her two children, who remained until

the latter part of June. We hear of no sickness during this time in this family. On July 9 another Mrs. Wilkins and her daughter came to visit Dr. Gray, the other visitors having departed. Just before noon, July 20, Mrs. Wilkins was taken suddenly (without previously feeling sick) with a chill, followed by high fever. She was treated by Dr. Gray. If circumstantial evidence is to receive any consideration whatsoever in the search after the first cases, then probably she was the first case of yellow fever in the Gray house, for she gave to me, under the severest questioning, a good history of an attack, even to the appearance quite out of time of her menstrual period. This was something unusual, and was a subject for comment at the time. She returned to her home shortly after her recovery. Her daughter was never sick.

About the time Mrs. Wilkins was getting up two of Dr. Gray's children were taken sick with what it is reasonably certain was yellow fever. Both children were badly exposed after that time and have since then been sick. These children had not recovered when Dr. Gray went down with an attack of fever which proved to be fatal, and which was undoubtedly yellow fever.

FIRST FATAL CASE.

Dr. A. S. Gray was taken with a chill about 9 o'clock on the morning of August 4, a third child being taken at the same time in the same manner. Dr. Gray was treated for "congestion" and malaria, dying of suppression. As we get the history, he probably had all the classical symptoms of a fatal case of yellow fever. Many people visited the doctor while sick and "sat up" with him, as is the custom in the country. After death several persons also sat up with the corpse, and at the funeral the body, exposed in an open coffin, was viewed probably by 75 or 100 people. It would be well to state incidentally that during the funeral ceremonies black vomit had to be wiped from the face of the corpse. The body was taken to the Orwood settlement for burial, but the day being so bad and rainy it was kept in the house of his brother over night.

The other undoubted case of yellow fever in the Dr. Gray home was Miss Sallie Wilson Gray, taken about five days before Dr. Gray's last illness. She has been exposed constantly since and has not been sick. There is no reasonable doubt that she had the fever before Dr. Gray.

SOURCE OF INFECTION.

There were several possible sources of infection under consideration by us, and it will be our effort to present each for your consideration as free from error as was possible under the conditions prevailing.

BANANA THEORY.

That the disease had been introduced into the house and family of Dr. A. S. Gray (the first cases) by a bunch of bananas carrying the fomites was the belief of Drs. H. A. Gant and H. H. Haralson, of the State board of health of Mississippi. The newspapers have published the statement far and wide that this was the method of introducing the fever into Taylors, though it must be borne in mind that neither Dr. Gant nor Dr. Haralson wished their opinions published so soon, and I believe were not responsible for this early publication. However, the responsibility lies with them, for it is on their wide and well-known reputation that such a report has received credence and become well-nigh firmly fixed in the minds of the lay public, and anything advanced by them relating to yellow fever deserves every consideration from the investigator. To the present time I gather from personal conversations with each that his opinion has not changed, Dr. Haralson making the reservation, however, that he was not wedded to the banana theory if something else could reasonably take its place.

THE BANANA STORY IN SUBSTANTIAL DETAIL.

A bunch of bananas was received in Taylor, May 30, 1898—it will be well to keep dates in hand—by a Miss Anna F. Wilkins, who was a visitor in the home of Dr. A. S. Gray. The express receipt for the bananas is signed by A. S. Gray, and it is said that the box was taken to his house and opened on the back porch, the straw being thrown into the horse lot. The overripe and mashed bananas, of which there was a "wash pan full," were picked off. The bunch was hung up on the veranda overnight and the next day was hung in a dark food closet in the kitchen. The closet was about 5 by 6 feet. The stove is only a few feet away. The kitchen is large. The bananas were eaten by the family at frequent intervals.

The history of the bananas shipped to Miss Anna F. Wilkins is peculiarly interesting and well worthy of the closest scrutiny. That bananas might be the means of carrying the organism of yellow fever can not be denied, for probably the germ would grow on the banana with the necessary heat and moisture conditions, providing there was decay or the peeling was broken.

The order for the bananas was given by Mrs. Wilkins's father, Capt. Frank Fennel, of Yazoo City, Miss., to a Mr. Hollingsworth, who was to visit New Orleans. On May 27 Mr. Hollingsworth ordered the bananas from Foto Brothers, No. 204-216 Canal street, New Orleans, La. Foto Brothers are large wholesalers, and shipped the bananas that day from a number of bunches just received from John G. Woods, importer, No. 806 Gravier street. Woods had the bananas taken off the steamship *Andes*, as shown by their shipping receipt, and taken directly to Foto Brothers, who immediately shipped, as stated above. The box of bananas was packed with rice straw, furnished by C. Getsinger, Canal street, who furnishes only new straw for this purpose.

The box was received in Holly Springs May 28, and remained there until the 29th, when the top of the box was removed by Mr. Ross, the agent, and readdressed to Mrs. Anna F. Wilkins at Taylor. Mr. Ross states that the bananas were in good condition, and that the story that the odor was very foul and the bananas badly damaged is untrue, there being only a few mashed and overripe, and this statement was concurred in by Mrs. Wilkins and Mrs. Gray.

As stated above, the box of bananas was received in Taylor May 30. This box was taken directly to Dr. Gray's house. Dr. Gray kept a small store and also sold bananas, and a number of shipments were made to him in July and two in August by the large firm of A. C. Treadwell & Co., of Memphis, Tenn. They were the only bananas received in the town of Taylor during the months of July and August, and as they came from a noninfected point have not been under serious consideration.

It will be seen that the bananas were never, properly speaking, in the city of New Orleans, for they were carried by a dray wagon directly to Foto Brothers from the steamer *Andes*. Foto Brothers' business house occupies a triangular block, there being no houses near it. No one sleeps in the building. The bananas are ripened as they are by all large wholesalers. The bunch referred to was a partly ripe bunch, and was sent directly from the shipping floor, and did not go into the storage room.

If the bananas were infected, then the infection was from the steamship *Andes*. The *Andes* was inspected and allowed to proceed from the Louisiana river quarantine station on May 26. She entered New Orleans May 27 from Port Limon, Costa Rica. The bunch of bananas was taken out and forwarded to Mrs. Wilkins that same day. From May 30 to the first suspicious sickness, approximately dated July 20, is fifty-one days. This was a long time, and the secondary infection, if there was one, was very tardy, and became operative only after an interval of time too long to be probable. There was no sickness in the Gray house in the meantime, except that once Dr. Gray was sick for a few days with

fever—about the 20th of July. If the bananas were infected at the time mentioned, it does not seem likely that the fever would put off operation so long. Some one should have been sick earlier. It must be kept in mind that the closet in which the bananas were kept was in constant use. It was not kept shut, and therefore there was little, if any, dead air.

OTHER POSSIBLE SOURCES OF INFECTION.

The other possible sources of infection were gone into most carefully. Close search was made to find a clue in some itinerant laborers or tramp or traveling man being sick in Taylor. The books were searched for the shipment of household goods or clothing into Taylor. All visitors to the town in the month of July were diligently inquired after. It was easy to brush all this evidence aside as unreliable and unprofitable. No household goods were received except one box of clothing by a man residing some distance in the country. The box of clothing was shipped from a point in Tennessee. One mattress had been shipped from Durant, Miss., to one Mr. Snellin at Taylor, July 16, but this mattress was new. A tramp had been in Taylor and the said tramp was sick and was treated by Dr. Gray. This tramp went about a mile north of the town and stayed all night at the house of one Mr. Seisenger. Nothing further can be learned of him definitely, nor am I able to give approximate dates. There was a story that some Louisville and Nashville box cars had been sided in Taylor, in which soldiers had been transported over the Louisville and Nashville road, running out of New Orleans, and that these cars were very dirty, and that those who cleaned them out remarked about the filth in the cars. The only person who could have given a correct account of these cars, and he was also the one who first told it, died soon after the outbreak of the fever. This person was the railroad agent. With the most diligent search of the company's books I was never able to locate any cars answering this description. No visitors or strangers were sick in or about Taylor during the month of July, save the tramp mentioned above, and cases in a railroad construction gang on the Illinois Central operating at that time in Taylor and vicinity.

SNELLIN CONSTRUCTION GANG.

This leads us to the consideration of the report on the railroad gang which was investigated in part by Dr. Joseph Waldaner, whose report is embodied herewith. This construction gang had been made up at Jackson, Tenn., division headquarters, and sent to Goodman, Miss. The shanty cars, it is said, had been lying idle for several months in the yards at Jackson, Tenn., and were used first by Mr. Snellin. At Goodman Mr. Snellin hired several negroes for his gang. These men, so far as we can learn, were from Goodman, and had not been away. Mr. Snellin left Goodman July 10, and went to Taylor, where he remained until August 26, when the gang was removed to Bolivar.

As soon as the fever was announced in Taylor the people along the line of the Illinois Central objected to these men being near them, and they were ordered to move, the gang soon breaking up. About fifteen of the laborers lived in Taylor and most of them returned during September. Others went to Oxford, Coldwater, and other places.

HISTORY OF FEVER IN SNELLIN'S WORK GANG.

Dr. Waldaner was instructed to find Mr. Snellin and as many of his men as possible, and obtain a running statement from each, avoiding as much as possible asking the leading questions. It was thought that by following up each person we

might be able to trace back the first infected point or to the first case. The question of spread was an easy matter if we could lay our hands, as it were, on the first case. This evidence is filed as an attachment to Dr. Waldaner's report. The statements are only worthy of consideration if we wish to accept circumstantial evidence.

I wish to invite your attention especially only to a few of the statements.

The evidence of George Riley, who sickened July 10, is important. Riley states that he went to New Orleans from Holly Springs the first part of July on a freight train. * * *

Mrs. Wilkins tells of Dr. Gray saying to her that if there were yellow-fever cases around he would say that he had cases among the gang of railroad hands, several negroes mentioned being sick in the shanty cars.

The question of fomites naturally suggests itself to our minds, but by far the most reasonable is that Riley was in New Orleans about July 4, and that he took sick six days later, and thus infected the shanty cars used for living quarters by Snellin's men. That others got sick in this gang has been established. Riley, for instance, stated that several of the boys got sick and were attended by Dr. Gray and a "one-armed man" (Dr. Mathis). It will be well to bear in mind that Taylor is not low, and that malaria is uncommon in the town. So far as the dates for secondary infection are concerned, they will appear more reasonable than the banana theory of fifty-one days, for we have John Jeffries sent home to Waterford July 21, as shown by the records. Others got sick later, one after another.

The depot was known to be an infected focus early, and yet no one had been sick of what was pronounced yellow fever there. One telegraph operator came there to work and never went outside until after he had developed yellow fever. He took the fever in five days. The depot may have been infected by John Jeffries, who lay there part of the day, while sick, on his way to Waterford. The shanty cars were sided near the railroad, the main line being used for a walk way. People in passing along the railway would pass within 10 feet of these cars. There was constant passing by these cars. Dr. Gray's children frequently went with him to the depot and possibly to the cars.

Your attention is also invited to the testimony of Dr. Mathis, who attended Mr. Snellin while sick. Dr. Mathis told me that he believes now that Mr. Snellin had yellow fever (though at the time he saw him Mr. Snellin had taken considerable whisky, which masked the symptomis). This collective evidence is of no particular value except to show that more than likely this gang was infected. Mr. Snellin may have contracted his fever from the same source as Dr. Gray and young Williams, both of whom were dead by the time he became seriously sick. Mr. Snellin refers to a Mr. Ragland giving him some medicine, and he tells me that Mr. Snellin looked like Dr. Gray did before he died, and several made remarks about it. Mr. Ragland is the postmaster at Taylors.

Several negroes testified that Mr. Snellin was sick while in Taylors; several also speak of the sickness of the conductor, his being yellow, etc. There can be very little doubt that there were yellow fever cases in these shanty cars. Men who were exposed in and around these cars went away and got sick with what I believe must have been yellow fever. Some of these men were sick in a boarding house near the depot at Oxford, going down with fever one after another. Mr. Snellin went to his home at Coldwater and was relieved by a Mr. Smith. Mr. Smith boarded at the Williams house, and went down in five days after coming to Taylors. He was in and out of the shanty cars constantly.

METHOD OF SPREAD.

There can not be much controversy over the spread of the disease from Taylors. Dr. Waldaner calls attention to the number of tickets sold to Taylors from Oxford;

to Taylors from Water Valley, and from Taylors to both points. The communication between Taylors and Orwood was by country road, Taylors being the nearest railroad point to Orwood. There is also frequent communication between all these points by driving over country roads, all the towns being close together. Matters of dispute about diagnosis and methods of introduction from one town to another are of little importance. It will be within the truth to say that the undiscovered and concealed cases of yellow fever quite overbalance the errors of diagnosis.

COMMENTS ON CASES AND FOCI.

If we accept the banana theory the interval of time seems hard to surmount. From the time the bananas were taken into Dr. Gray's house to the time of the first probable case of sickness in the house was fifty-one days. The first case of sickness at all suspicious in the house was Mrs. Blanch Wilkins on July 20 (?). I believe she had yellow fever. The next cases were the two Gray children, then Miss Sallie Wilson Gray, and then Dr. Gray—the first fatal case.

Mrs. Blanch Wilkins tells of Dr. Gray being sick with a fever before she was, and that he was sick, "ailing around," several days. That when he got around again he was imprudent and ate too much, and had quite a number of vomiting spells, with fever. He would get up and attend to his business for a little while and then lie down again. While sick with this fever the first day, the doctor told her that he had a sick man down in the "gang" who looked very suspicious, and that if there was any yellow fever around he certainly would say that this man had it. Mrs. Wilkins playfully pretended to be afraid of him, and remarks were made about it several times afterwards. Now, Dr. Gray did visit the shanty cars to see sick negroes as stated by Riley and others. Dr. Gray's books do not show any entry or business transactions with these men; his visits were probably cash transactions.

If Dr. Gray was the first case in the Gray household, and if he partly recovered but died of relapse, which is quite possible, then it would certainly be easy to trace the infection to the cars. If he was not the first case, then our source of infection is certainly aggravating and elusive. If the bananas, why so long in causing trouble? Did the atmospheric conditions retard the growth fifty-one days to a favorable time? That is possible. But if that be true, how are we to account for the infection of young Williams, who was taken sick at the same time as Dr. Gray, dying a day later than the doctor? I have the most positive evidence, written and verbal, that young Williams was not inside the Gray house covering the period under discussion. He was on the veranda of the house for a few minutes only, but never inside, and that was several days before he got sick. Young Williams was, however, in and around the shanty cars a number of times. The cars were sided nearly in front of his father's house. Of course, if Dr. Gray's first attack was not yellow fever, and if there is no mistake that his children and two visitors had the fever before him, then there are only three sources of infection possible for these members of his family, and those are: Fomites by the doctor's person from the shanty cars; by our old friend, the bananas, or from exposure near the shanty cars, which was certainly an infected point. The main line of railroad across a bridge was used as a walk way in going to several houses in the southern part of the village, and was within 10 feet of these cars. If these cars were infected there was every chance for contracting the fever merely in passing. Another question which was investigated was where the hands went when using privy vaults, as that could readily be a source of infection to the whole town. This privy house was dirty and foul smelling. It was near a ravine, about 25 feet from the railroad, about 50 feet from the depot (which proved to be a bad focus), and only a few feet from the nearest shanty car, and the walk way on the railroad most used by people in that part of the place.

NEXT CASES.

The next cases were old Mr. Taylor on August 10 and Mrs. Taylor August 11. Both were in Dr. Gray's house and attended the funeral. Mrs. Taylor attended the funeral of young Williams.

The next positive case was on the 14th, in the family of the section master, who lived near where the shanty cars were sided. His little boy was first sick, and two days later his little girl went down. The girl was seen by Dr. Baird, of Oxford, who made a diagnosis that the case was suspicious, and after her recovery expressed the opinion that it was yellow fever. These cases had been exposed in the Williams house and to the Taylors, but the time for secondary infection in these houses was too short, and Mr. and Mrs. Taylor got sick August 10 and 11, respectively, and young Williams on the 4th, the young man dying on the 10th. These children were exposed to these shanty cars, though never inside.

INTRODUCTION OF FEVER INTO OTHER TOWNS FROM TAYLORS.

The fever was introduced into Oxford probably from several sources. The exposures to Taylors were many, and if, as is reasonable to believe, that part of the village near the cars was infected, it is in the probabilities that some one of the many passengers to and from Taylors carried the disease to other points during July and August. For the months of July and August the agent's books for the Illinois Central show that there were sold between the points of Taylors, Water Valley, and Oxford 442 tickets. Two hundred and forty-five of these tickets, including round trips, were to persons going to either Oxford or Water Valley from Taylors.

Besides this, many persons drove from one town to another. At Dr. Gray's funeral there were people from all around the adjacent country.

Granting, then, the widest latitude for errors in diagnosis in light and suspicious cases, it is still essentially true that there were many foci in north Mississippi never discovered or reported.

It is uninteresting to go further into the details of the spread to other towns than those shown in Dr. Waldauer's report.

CONCLUSIONS.

I believe George Riley to have been the first case; that he infected the cars, and that the cars and privy house infected the town of Taylor, and that the first case in the Gray house got the fever from exposure to the vicinity of the depot and the shanty cars. Dr. Gray's children were down by the railroad a number of times, and probably every day. This implies that Riley received the infection while in New Orleans in early July. Could infection have been received from New Orleans as early as July? We have no direct proof on that point and I fear that this will be difficult to be obtained; but the fact that a number of towns in Louisiana on roads communicating with New Orleans, other than the Illinois Central system, were infected early—Plaquemine, July 11; Franklin, August 6; Litcher, August 5 (the first case being in a man recently from New Orleans), etc.—points, I think, to a common source of infection as early as the time in question.

I am informed by Surg. H. R. Carter that when the first cases of fever were recognized at Harveys Canal, just opposite New Orleans, on August 25, they were observed in such numbers (about twenty) as to indicate introduction and an established focus of four or six weeks' standing; even a longer time is probable.

Again, knowing that the other towns from which this gang was collected, viz: Coldwater, Jackson, Tenn., Oxford, Holly Springs, and Taylor were free of suspicion or infection; and it being generally acknowledged that yellow fever had

existed in New Orleans for an indefinite period prior to its official announcement, the fact of yellow fever developing in this gang, after the suspicious sickness of Riley from New Orleans, is itself almost enough evidence that it existed there in early July.

It is highly improbable that a bunch of bananas handled as this was and exposed on the veranda over night would retain the infection, even though it had been previously infected. The bananas remaining on the bunch were sound, and the peeling of the bananas remaining intact, there was no further chance for them to act as culture media.

The interval of time from receipt of the bananas to the approximate date of the first case was fifty-one days. The bananas, properly speaking, had never been in New Orleans, only passing through. If the bananas had been ripened by some small fruit vender by putting the bunches under his bed or hanging them in dark closets in his house, the question would have become an interesting one. Of course, it was from this standpoint alone that Drs. Haralson and Gant took it up with such seriousness.

The disease spread along the railroad from a common focus. Railroad people were usually the first ones to take the disease, and they infected the towns.

[Inclosure No. 1.]

Dr. WALDAUER'S REPORT.

Referring to your letter of instructions of October 8, 1898, which is filed herewith and marked Exhibit A, and previous conversation, I have the honor to report as follows:

* * * * *

My investigation led me to believe that yellow fever was introduced into north Mississippi by one George Riley, colored, a member of the construction gang of the Illinois Central Railroad, said gang being in charge of Mr. Snellin, as foreman. Riley joined the gang at Goodman, Miss., on July 7, and for further evidence relating to him you will refer to his deposition in Inclosure No. 2. As to the introduction of the disease into Taylor, Miss., by Mr. Snellin's work gang, which was the next point of infection, you are specially referred to Mr. Snellin's deposition in Inclosure No. 2, and that of Dr. Mathis, also in Inclosure No. 2. Your attention is called to the stenographer's and other evidence gathered from Snellin's work gang, conductors, engineers, and firemen of the Illinois Central Railroad, all of which is attached hereto. This evidence, taken collectively, shows that there was sickness among the men working in Snellin's gang along the road between Taylor, Miss., and Jackson, Tenn., where they broke up September 5.

* * * * *

Much of the evidence was taken down by a stenographer. The other from notes. Many, and especially negroes, gave information reluctantly, fearing that some blame would be laid on them, and it was very hard to get connected stories. My investigation in Kentucky was greatly facilitated by Passed Assistant Surgeon Stimpson. The mortuary records of Oxford and Water Valley are not as complete as they might be, but the most reliable obtainable.

Respectfully,

JOS. WALDAUER.

Acting Assistant Surgeon, U. S. M. H. S.

P. A. Surg. J. O. COBB. U. S. M. H. S.

[Inclosure 2.]

SYNOPSIS OF THE SWORN EVIDENCE OF PERSONS EXAMINED BY ACTING ASSISTANT SURGEON WALDAUER AND SUBMITTED WITH HIS REPORT.

George Riley, colored, states as follows: Had been living at Holly Springs. Went to New Orleans in early part of July. Staid only one day. Went to buy a suit of clothes. Bought a second-hand suit from a store on Poydras street, near the market. Came back and joined Snellin's gang July 7 at Goodman, Miss. Was taken sick at Taylor July 10. Had just arrived. Had chill, followed by fever, headache, backache, and severe pain in the eyes, and sick stomach, lasting some time. Was sick eight or nine days, and very weak afterwards. Gained strength slowly. Was attended by Dr. Gray. Several others in the shanty cars got sick after he got well; also Mr. Snellin. These were attended by Dr. Gray and a one-armed man (Dr. Mathis).

Snellin states that George Riley got sick at night, and when he recovered went back to his home.

The examination of the evidence of W. W. Snellin, foreman of gang, Mrs. Snellin, Fred. Snellin, the foreman's son, Elbert Gilmore, John Thomas, John Highmoore, Theodore Thomas, John Hightower, and Sam Stillwater, members of the gang, shows that Riley was taken sick as aforesaid; that he was sick six or eight days; that there was much sickness in this gang (of negroes) after Riley got well, the names of seven men being given as sick at Taylor in the early part of July, a number of them sick enough to go home in convalescence. There had been but little sickness in this gang prior to this time. Of three, it is stated that they had their chills at night; of the others the time is not stated, it not having been asked. Mrs. Snellin and her two children, who had been well, became sick about two and one-half weeks after her husband's return (on account of sickness, from Taylor); they had a single attack each, of some day's duration. She believed the attacks to be malarial. The description of the sickness in the shanty cars is mainly indefinite, but where definite, is like yellow fever, and in none is more than one attack predicated. These men were attended by Dr. Gray, and after he sickened with yellow fever, by Dr. Mathis. The latter saw Mr. Snellin when sick at Taylor and says he had had a chill and had a severe backache and headache. "I should call it a very suspicious case, for, looking backward, Snellin's certainly looked like a yellow fever case." A sick negro whom he saw there gave similar symptoms. Dr. Mathis had not seen yellow fever when he saw Snellin, but had seen and attended it and had it himself before making above statement.

It is to be noticed that every case of sickness at Taylor seen by Drs. Haralson, Gant, and Carter the last of August and early part of September, was with one exception yellow fever, and the subsequent history of those who had been sick, with a diagnosis of malarial fever, showed them immune to yellow fever. There were certainly then not many cases of malarial fever among the residents of Taylor in August and September.

YELLOW FEVER PREVALENCE IN OTHER COUNTRIES

YELLOW FEVER IN CUBA.

Cuba has continued to be the great menace of the United States as regards the introduction of yellow fever into this country, for, as I have stated in former reports, it is possible to trace nearly all of the epidemics in this country to the introduction of one or more cases from Cuba, usually from Havana. In that city alone, from the 2d of

July, 1897, until March 31, 1898—since which time, owing to the withdrawal of the United States sanitary inspector from the city during the Spanish-American war, no reports have been received relative to the mortality of the city—562 deaths occurred from yellow fever.

No reports have been received from any of the Cuban cities—with the exception of Santiago after its surrender—since March 31, 1898.

From July 1, 1897, to March 31, 1898, there were 1,410 deaths from yellow fever reported from various localities in the island of Cuba, of which the more important were the following cities: Cienfuegos, Havana, Manzanillo, Matanzas, Sagua la Grande, and Santiago.

During the calendar year 1897 the following number of deaths from yellow fever are reported, the figures being confined exclusively to cities:

Matanzas	238
Santiago	658
Sagua la Grande	378
Cardenas	235
Cienfuegos	212
Manzanillo	230
Holguin, Guines, Remedios, Sancti Spiritus, etc.	1,500
	<hr/>
Deaths from yellow fever in Havana during this same period.....	3,451
	<hr/>
Total	6,034

The greater number of these deaths occurred among the recruits for the Spanish army, and it is presumable that when reports for the latter half of the fiscal year are available, as regards the prevalence of yellow fever in Cuba during that period, they will show a considerable decrease in the totals, as but comparatively few recruits have been sent from Spain to Cuba during 1898.

JAMAICA—OUTBREAK IN 1897.

On July 10, 1897, a case of yellow fever was discovered at Kingston, Jamaica, and from this time until the end of December cases appeared in the following parishes of the island: Kingston and St. Andrew, St. Thomas, Portland, St. James, Westmoreland, Manchester, and St. Catherine.

According to the statement of cases furnished the United States consul at Kingston by the colonial secretary, there were in all 150 cases and 58 deaths from yellow fever. Of this number—104 cases—40 deaths occurred in the city of Kingston and the parish of St. Andrew. Manchester was the next most severely afflicted parish, having 33 cases, of which one-third had a fatal termination.

Of the cases occurring in the parish of St. Andrew 20 of them occurred at the naval and military stations there.

SAN SALVADOR AND MEXICO.

San Salvador reports a total of 16 deaths from yellow fever during the period June 4 to August 7, 1898, while the country of Mexico, which has been for the past year exceptionally free from yellow-fever infection, has had during the summer of this year a few cases in Monterey, Vera Cruz, and a much more severe outbreak in Tampico, where over 100 deaths from it were reported between July 17 and September 1, 1898.

RIO DE JANEIRO.

It is only the distance of our seaports from Brazil that renders that country a lesser source of danger to us than Cuba.

Since the introduction of yellow fever into Rio de Janeiro in December, 1849, by the American brig *Brazil*, from New Orleans via Havana and Bahia (November 3, 1849), there have been in Rio alone upward of 54,461 deaths from it among the inhabitants of that city. During the last six months of the present fiscal year there have been 939 deaths from yellow fever in Rio. The rate of mortality of the yearly outbreaks, or rather recrudescences of it—as it is but rarely wholly absent—varies very considerably in different years, even when the meteorological conditions are apparently the same, a fact for which it is difficult to find any sufficient reason. The greatest epidemics in Rio occurred in the years 1850, 1852, 1857, 1860, 1870, 1873, 1875, 1876, 1878, 1880, 1883, 1886, 1889, 1891, 1892 (during these two years there were 8,769 deaths from it in Rio), 1894 (during this year there was the greatest number of yellow-fever deaths in Rio in any one year since its introduction, viz, 4,715), and 1896.

A full and complete report of the deaths from yellow fever in Rio during the first six months of 1898, with statistical tables, etc., and a statement of yellow-fever deaths by years since 1849 is as herewith presented, having been furnished by the United States consul-general at Rio:

YELLOW FEVER IN RIO DE JANEIRO SINCE 1849, WITH STATISTICAL TABLES.

By the UNITED STATES CONSUL-GENERAL.

The first appearance of yellow fever in Rio de Janeiro in December, 1849, undoubtedly constituted an event of graver importance than anything that has happened here before or since. From that time on this terrible scourge has exercised its pernicious influence on the development of the great Brazilian metropolis, which would otherwise be one of the most healthy of the world's great cities, as it certainly is one of the most beautiful. As far as shown by the official records, yellow fever has caused in Rio, up to July 1 of this year, the death of not less than 54,461 of its victims, 939 since January 1.

The American brig *Brazil* from New Orleans, by way of Havana, brought the infectious microbes to Bahia (November 3, 1849), whence the disease was carried into Rio, and there are strong reasons to assume that those records do not state the whole truth.

In view of the importance of this matter, I beg leave to submit to the Department of State the inclosed tabular statements which I have compiled from the official figures.

Regarding the mortality in yellow-fever cases, the following must be added in explanation: For reasons which the best medical experts have not yet succeeded in explaining, the death rate among the yellow-fever patients is very different in different years, even if the meteorological conditions are the same, but it is never as great as it appears from the public statistics. The law which makes it obligatory that every case of yellow fever should be reported to the medical authorities is frequently circumvented; the number of cases on record is therefore smaller than the actual number, consequently the percentage of deaths apparently larger than in reality, although a considerable number of deaths from yellow fever is not reported or is classified under a less alarming caption.

It is a characteristic feature that the foreign-born inhabitants constitute not less than about 85 per cent of the victims of yellow fever. Newcomers are all in great danger during the summer months. (Of the very few foreign diplomatic and consular officers living in Rio there died during the season: The minister of Chile, the Haitian consul, the chancellor of the French consulate, and the chargé d'affaires of Chile.)

One of the results of this condition is the fact that during the fever season (from beginning of December to the end of May) most of the foreigners live in the more or less remote suburbs in the mountains surrounding Rio, where they enjoy a comparative immunity from the disease. This, of course, involves a great expense and a great loss of time.

The best known and most frequented of those health resorts is Petropolis, since 1894 the capital of the state of Rio de Janeiro, about 2,500 feet above the level of the sea, in the Serra da Estrella. The diplomatic corps, with but few exceptions, and the majority of the foreign business men reside there with their families, most of whom have to make daily trips to Rio.

The permanent injury caused to Brazilian commerce, trade, immigration, etc., by the yellow fever is enormous. It can not be denied that the local authorities are doing a great deal within their limited financial means and under the peculiarly difficult ethnological conditions to fight this plague.

Deaths from yellow fever in Rio de Janeiro during the years 1850 to 1897.

Years.	Deaths.	Years.	Deaths.	Years.	Deaths.
1850.....	4,160	1867.....	.....	1884.....	640
1851.....	471	1868.....	18	1885.....	445
1852.....	1,943	1869.....	274	1886.....	1,446
1853.....	853	1870.....	1,118	1887.....	135
1854.....	21	1871.....	9	1888.....	754
1855.....	.....	1872.....	295	1889.....	2,155
1856.....	.....	1873.....	3,659	1890.....	719
1857.....	1,425	1874.....	841	1891.....	4,456
1858.....	800	1875.....	1,308	1892.....	4,313
1859.....	500	1876.....	3,476	1893.....	742
1860.....	1,249	1877.....	283	1894.....	4,715
1861.....	247	1878.....	1,177	1895.....	818
1862.....	12	1879.....	974	1896.....	2,909
1863.....	15	1880.....	1,623	1897.....	159
1864.....	.....	1881.....	257	Total.....	53,522
1865.....	.....	1882.....	502		
1866.....	.....	1883.....	1,606		

Deaths from yellow fever in Rio de Janeiro during the first six months of 1898.

Months.	Number of deaths.	Months	Number of deaths.
January—		April—	
1-8	1	9-15	74
9-15	2	16-22	76
15-22	6	23-29	61
22-29	8	30	8
29-31	4	May—	
February—		1-6	46
1-4	3	7-13	53
5-11	8	14-20	33
12-18	25	21-27	38
19-25	37	28-31	16
26-28	18	June—	
March—		1-3	10
1-4	24	4-10	19
5-11	44	11-17	26
12-18	62	18-24	10
19-25	68	25-30	18
26-31	60		
April—		Total	939
1-8	81		

Total mortality in yellow fever cases, from 1850 to 1897 53,522
 From January to July, 1898 939

Total up to July 1, 1898 54,461

Table showing nationality of patients in the Hospital Sao Sebastiao (yellow fever hospital), Rio de Janeiro.

Nationality.	1892.	1893.		1894.		1895.		1896.		1897.	
	Pa- tients.	Recov- ered.	Died.	Recov- ered.	Died.	Recov- ered.	Died.	Recov- ered.	Died.	Recov- ered.	Died.
Africans	1							2		2	1
Americans	13			22	11	3	5	12	7	1	
Argentines, Uruguayans	9	1	2	7	7	2	1	7	4	3	
Asiatics	6					4		1	1		
Austrians, Hungarians	64	6	3	8	9	9	7	14	20	4	1
Belgians, Dutchmen	24	1	2	14	18	5	12	5	3	5	
Brazilians	192	22	10	153	60	34	16	133	67	135	16
British	93	1	5	243	112	21	20	72	40	7	5
Chilians, Peruvians	7			1	2			1	2	1	
Danish	1			25	14	3	4	6	7		1
French	165	15	14	39	33	16	11	24	25	4	3
Germans	95	10	5	72	60	18	21	45	18	13	3
Italians	512	47	34	150	185	37	77	172	191	24	17
Other European	10	2	3	12	6	4	2	7	8		
Portuguese	1,372	213	172	1,017	784	323	238	1,045	842	158	38
Russians, Polanders	329	10	4	47	36	9	10	20	24	4	3
Spaniards	670	115	84	391	313	128	81	281	213	75	25
Swede, Norwegians	28			166	56	20	10	50	16	19	6
Turkish, Arabians			1	6	7		3	12	16	3	
Nationality unknown	52			1	34		3		6		
Totals	3,643	443	339	2,374	1,747	636	513	1,909	1,510	508	119

1890:	1891:	1892:
Recovered 595	Recovered 1,859	Recovered 2,097
Died 455	Died 1,614	Died 1,546
Total 1,050	Total 3,473	Total 3,643

Mortuary table, Hospital Sao Sebastiao, arranged according to age of decedents from yellow fever.

Age.	1886.	1887.	1888.	1889.	1890.
0 to 1 year	14			19	2
1 to 5 years	105	4	20	151	18
6 to 15 years	143	10	44	202	64
16 to 35 years	587	65	363	832	135
36 to 60 years	144	21	94	235	482
More than 60 years			2	12	13
Age unknown	13		2	3	5
Totals	1,015	100	525	1,454	719

YELLOW FEVER IN OTHER BRAZILIAN CITIES.

Yellow fever is not, however, by any means, confined in Brazil to the city of Rio de Janeiro. It is only on account of the greater morbidity and mortality from this disease there that it is necessary to especially draw attention to the great South American seaport.

One hundred and sixty-six deaths from yellow fever have been reported from Para from July 1, 1897, to date of this report; 60 from Ararraguara from March 1 to June 1, 1898; a few cases at Bahia; 148 deaths at Sao Carlos de Pinhal during March, April, and May, 1898; and 209 deaths at Santos since January 1, 1898.

Other cases and deaths in Brazil have been returned from Sao Paulo, Taboticabal (42 deaths in April, 1898), Tahir, Victoria, Rio Clara (33 deaths from April 1 to June 1, 1898), Ribeirao Bonito (22 deaths in February and March, 1898), Jaboticabal, Deacalvado, and Ceara.

The following table of yellow-fever cases and deaths, occurring throughout the world—the United States excepted—has been prepared in the division of sanitary reports and statistics in the Bureau, and is herewith appended.

Table showing yellow-fever cases and deaths in foreign countries November 1, 1897, to November 1, 1898.

Country.	Date.	Cases.	Deaths.	Remarks.
Brazil:				
Araraguara	Mar. 1-Mar. 31..	4	3	Taken off of Norwegian bark Adonis.
	Apr. 1-May 31..	125	57	
Bahia	Dec. 27.....	3	2	
	Dec. 29.....	6		
	May 2-June 7..	6	3	
Ceara	Nov. 1-Nov. 30..		1	
Descalvado.....	May 1-May 31..	2	1	
Jaboticabal	Mar. 1-Mar. 31..	35	16	
Para	Nov. 14-Nov. 27..		10	
	Dec. 12-Jan. 1..		24	
	Jan. 2-Jan. 15..		22	Yellow fever reported.
	Jan. 16-Feb. 28..		30	
	June 1-June 23..	5	1	
	Sept. 20-Oct. 3..		3	
Ribeirao Bonito.....	Feb. 1-Mar. 31..	99	22	
	Apr. 1-Apr. 30..	6	3	
Rio Clara.....	Mar. 1-Mar. 31..		9	
	Apr. 1-May 31..	69	33	
Rio de Janeiro	Nov. 21-Dec. 4..	1		
	Dec. 5-Jan. 1..	8	3	
	Jan. 1-Jan. 29..		17	Yellow fever reported epidemic.
	Jan. 30-Sept. 23..		1,039	
São Carlos de Pinhal.....	Feb. 28-Mar. 31..	223	58	
	Apr. 1-May 31..	262	90	
	May 24.....			
Santos.....	Jan. 2-Jan. 8..	1	1	
	Jan. 23-Jan. 29..	3		
	Jan. 30-Feb. 28..	21	3	
	Mar. 1-Mar. 31..	32	13	
	Apr. 1-Apr. 30..	103	52	
	May 3-May 24..	159	97	84 deaths in isolation hospital.
	June 4-June 18..	72	43	
São Paulo	Feb. 1-Mar. 31..	4	3	
Taboticabal	Apr. 1-Apr. 30..	106	42	
Tahir	May 1-May 31..	3	1	
Victoria	Apr. 29-May 13..	3	2	

Table showing yellow-fever cases and deaths in foreign countries, etc.—Continued.

Country.	Date.	Cases.	Deaths.	Remarks.
Colombia:				
Cartagena.....	June 1-June 30.....	.....	1	
	July 1-July 30.....	5	4	
	Sept. 1-Sept. 30.....	.....	1	
Colon.....	June 6-June 22.....	.....	.....	Sporadic cases of yellow fever occur from time to time.
Costa Rica:				
Limon.....	June 14-Aug. 19.....	.....	3	
	Aug. 16-Sept. 10.....	.....	4	
Cuba:				
Cardenas.....	Sept. 5-Dec. 18.....	.....	15	
Cienfuegos.....	Aug. 30-Jan. 2.....	.....	30	
	Jan. 3-Jan. 23.....	.....	1	
Havana.....	Nov. 4-Dec. 30.....	.....	56	
	Dec. 31-Oct. 27.....	.....	113	
	Mar. 4-Mar. 31.....	.....	4	
Manzanillo.....	Nov. 1-Dec. 31.....	.....	50	
	Jan. 1-Jan. 31.....	.....	9	
	Feb. 14-Feb. 28.....	.....	3	
Matanzas.....	Oct. 28-Jan. 19.....	.....	10	
	Feb. 9-Feb. 23.....	.....	2	
Regla.....	Oct. 31-Dec. 11.....	74	50	
	Dec. 31-Feb. 28.....	.....	7	
	Mar. 1-Mar. 24.....	.....	2	
Sagua la Grande.....	Dec. 18-Jan. 20.....	.....	.....	A few cases of yellow fever, but impossible to obtain statistics.
Santiago de Cuba.....	Oct. 31-Jan. 29.....	.....	15	
	July 20-Aug. 2.....	.....	.....	Yellow fever reported.
	Aug. 18.....	.....	1	
Siboney.....	July 10.....	14	.....
Haiti:				
Cape Haytien.....	Nov. 6.....	.....	.....	Yellow fever reported.
Port au Prince.....	Nov. 10.....	2	1	
Jamaica:				
Brownstown, St. Ann's.....	Nov. 7-Nov. 20.....	7	.....
Buff Bay.....	Oct. 17-Nov. 20.....	1	1	
Kingston.....	Aug. 1-Nov. 27.....	83	34	
	Nov. 27-Dec. 11.....	.....	4	
	Dec. 19-Feb. 19.....	5	4	
Manchester.....	Aug. 1-Dec. 11.....	29	9	
Morant Bay.....	Nov. 7-Nov. 20.....	1	1	
Port Antonio.....	Aug. 1-Nov. 20.....	4	4	
St. Andrew.....	Nov. 14-Dec. 11.....	3	.....
	Dec. 19-Mar. 5.....	2	1	
St. Catherine.....	Nov. 7-Nov. 20.....	4	.....
	Dec. 19-Jan. 1.....	1	.....
St. Elizabeth.....	Aug. 1-Nov. 20.....	1	1	
	Dec. 19-Jan. 1.....	1	1	
St. James.....	Nov. 20-Nov. 27.....	1	1	
Westmoreland.....	Nov. 7-Nov. 20.....	1	1	
Mexico:				
Jiminez.....	Sept. 28.....	.....	.....	Yellow fever reported.
Monterey.....	Aug. 2-Nov. 1.....	51	12	
Tampico.....	July 17-July 21.....	15	7	
	July 24-July 31.....	.....	9	
	Aug. 1-Oct. 16.....	.....	202	Reported epidemic Aug. 6.
Vera Cruz.....	July 9-Oct. 27.....	.....	52	1 case reported.
Santo Domingo:				
Santo Domingo.....	May 7-May 14.....	1	1	
San Salvador.....	June 4.....	34	8	Yellow fever reported.
	July 2.....	5	2	
	July 10-Aug. 7.....	33	6	
West Indies:				
Curaçao.....	June 4.....	10	1	On H. M. S. Atkmaar. Patients taken to quarantine hospital.
Yucatan:				
Merida.....	July 8.....	.....	.....	Yellow fever reported.

INVESTIGATION OF THE CAUSES OF YELLOW FEVER BY THE UNITED STATES MARINE-HOSPITAL SERVICE.

As published in the public health reports of November 12, 1897, Surg. Eugene Wasdin, then passed assistant surgeon, and P. A. Surg. H. D. Geddings, who had been engaged in bacteriological study regarding yellow fever in New Orleans, were detailed, by direction of the

President, to investigate in Havana the cause of yellow fever. They arrived in Havana about December 1. Suitable rooms were provided and a laboratory established, and the work was continued until interrupted by the outbreak of hostilities. These officers have been directed to return to Havana and continue their investigation, the laboratory having been undisturbed during the war. Their preliminary report, subjoined hereto, gives encouragement that the true cause of the disease has been found by Professor Sanarelli in the bacillus icteroides, but further work is necessary for definite demonstration.

Following is a copy of my letter to you recommending this detail and giving my reasons therefor, and which received the approval of yourself and the President:

TREASURY DEPARTMENT.

OFFICE OF THE SUPERVISING SURGEON-GENERAL, M. H. S.,

Washington, D. C., November 8, 1897.

SIR: I respectfully invite your attention to my letter of August 30, 1897, requesting authority to send Passed Assistant Surgeon Geddings to Montevideo to make investigations into the alleged discovery of the germ of yellow fever by Dr. Sanarelli, and to subsequently pursue investigations into the cause of this disease at Santos, Rio de Janeiro, or other yellow-fever infected ports. This letter was duly approved by yourself, and was prepared also for the approval of the President. The letter was not presented to the President immediately, as he was out of the city. In the meantime, within a few days, the present epidemic of yellow fever in the South was announced at Ocean Springs, Miss., and the detail of Dr. Geddings was held in abeyance because his services were immediately required in the yellow-fever district. Later, while on duty in New Orleans, he was directed to pursue the investigations, meantime taking advantage of the yellow-fever epidemic in that city. Passed Assistant Surgeon Wasdin, who made the first diagnosis of the yellow fever in the present epidemic, and who himself contracted the disease and recovered therefrom, was also detailed for like service. Dr. Geddings, in a report dated November 1, states that Dr. Wasdin and himself have carried their investigations to a point where it is desirable that they should be continued in some more favorable locality. Authority is therefore requested to detail these two officers for duty in the port of Havana, where yellow fever exists during the whole year and where exceptional advantages may be had for the scientific investigation into the cause of the disease. These two officers are especially qualified for this investigation.

P. A. Surg. Eugene Wasdin has made a special study of bacteriology, and was professor of pathology for four years in Charleston, S. C., medical college. As previously stated, he made the first diagnosis of yellow fever at Ocean Springs, and insisted thereon in the face of much opposition and verified it by post-mortem examination.

Passed Assistant Surgeon Geddings is an expert in bacteriology and biological chemistry and is attached to the hygienic laboratory of the Service. Several years ago he was ordered to Johns Hopkins Hospital, and the Bureau was given a written assurance by the director of the laboratory of his competency to conduct original investigations. In later years he has been frequently called upon for special work of this character, his latest detail being as technical delegate on the part of the United States to the International Sanitary Conference held at Venice during the months of February and March, 1897. After the adjournment of the Venice conference, Dr. Geddings was engaged in special laboratory work in the Pasteur

Institute in Paris, and in Koch's Laboratory in Berlin, paying special attention to the discoveries of Sanarelli, as stated in my letter of August 30.

The discovery of the cause of yellow fever is a matter of vital interest and importance to the United States, as it would result in obviating large expense and place the preventive measures upon a strictly scientific basis, and prevent needless panic and such paralyzation of commerce and traffic as has prevailed during the past two months. Furthermore, it may be possible not only to ameliorate the conditions affecting commerce, but in the near future to apply preventive and curative measures to the individual.

I therefore respectfully request approval of this detail, the expenses for which can legally and appropriately be paid from the epidemic fund.

Respectfully, yours,

WALTER WYMAN,

Supervising Surgeon-General M. H. S.

The SECRETARY OF THE TREASURY.

Approved:

L. J. GAGE, *Secretary.*

Approved:

WILLIAM MCKINLEY.

On February 3, 1898, a supply of cultures of the bacillus icteroides and of the "serum antiamaryl" was sent to P. A. Surg. Eugene Wasdin, at Havana, and following is the correspondence relating to this subject:

TREASURY DEPARTMENT,

OFFICE OF THE SUPERVISING SURGEON-GENERAL, M. H. S.,

Washington, D. C., February 3, 1898.

SIR: The Bureau has this day received from Prof. J. Sanarelli, Montevideo, Uruguay, a number of flasks containing serum antiamaryl and cultures of the bacillus icteroides. These have been forwarded you to-day. It is suggested that you use the antitoxic serum in selected cases of yellow fever for the purpose of determining whether or not it has any specific effect on the disease. Careful notes should be taken on the cases so treated and a report of the result made to the Bureau at as early a date as practicable.

Respectfully, yours,

WALTER WYMAN,

Surgeon-General U. S. M. H. S.

HAVANA, CUBA, *February 18, 1898.*

SIR: I have the honor to state that the cultures of bacillus icteroides and 44 vials of "serum antiamaryl" have been received. Just at this time there are no cases of fever upon which to commence the test of this serum, since those at our disposal are practically well. I trust to carry out your wishes in a few days.

I will also state at this time that the process of isolating the so-called "Sanarelli bacillus" from the cultures obtained during the late epidemic in the Southern States proceeds slowly but satisfactorily, since it is our experience that the symbiosis of this organism with colon bacillus and other organisms results in a most marked inhibition of that active motility which seems to distinguish it more readily from the colon group.

It has been our fortunate experience to have isolated this bacillus from blood taken from a patient in the hospital at Camp Fontainebleau, Miss.

* * * * *

EUGENE WASDIN,

Passed Assistant Surgeon, U. S. M. H. S.

The SURGEON-GENERAL MARINE HOSPITAL SERVICE.

PRELIMINARY REPORT OF MEDICAL OFFICERS DETAILED BY DIRECTION OF THE PRESIDENT AS A COMMISSION TO INVESTIGATE IN HABANA THE CAUSE OF YELLOW FEVER.

REPORT OF SURG. EUGENE WASDIN.

WASHINGTON, D. C., *November 1, 1898.*

SIR: I have the honor to submit the following general summary of the work of the commission appointed by you, with the consent of the President of the United States, for the purpose of investigating the etiology of yellow fever.

Introductory to this, I must mention the work done by me, prior to this detail, in this direction, during the prevalence of the yellow fever along the Gulf coast of Mississippi and Louisiana during October and November of 1897.

In compliance with your directions I had commenced such investigation at Ocean Springs, Miss., during the latter part of September, visiting a number of cases, and securing tube cultures from the living blood. Early in October, through the courteous invitation of Dr. S. R. Olliphant, president of the board of health of Louisiana, and of Prof. P. E. Archinard, bacteriologist to the board, and by your permission, I joined Dr. Archinard in the investigation being conducted by him in New Orleans, where the fever existed. This investigation had been instituted by the authorities of the Charity Hospital, and to Dr. Bloom, the courteous superintendent and resident surgeon of that institution, I am indebted for the privilege of visiting the isolation division of that hospital, and the valuable opportunity of working in conjunction with the gentlemen detailed for that especial duty. Other than a study of the large number of cases of the disease at this hospital, which I estimate an invaluable experience, I entered actively into the pathologic and bacteriologic work. A detailed description of this work would anticipate the report of the pathologist in the proposed general report of the epidemic by the authorities of the Charity Hospital, since it was assumed that any and all work done would be for the use of that institution. It suffices to state that it was impracticable to make, during the limited continuance of the fever, extensive bacteriologic examination of any individual case, owing to the number of necropsies held during this time; and it was necessary to postpone examination in most cases to a later date, the cultures from the blood and organs being carefully preserved, together with those obtained at Ocean Springs.

I should here refer to the uniform courtesy of the gentlemen who formed the general staff of the isolation hospital, Drs. Veazie, Hamilton, Jones, and Pothier, with whom it was a pleasure to be associated. The bacteriologic work was carried on in the laboratory of the medical department of the Tulane University, under the direction of Professor Archinard, from whom, and the dean of the college, Prof. S. E. Chaille, many courtesies were received by myself and P. A. Surg. H. D. Geddings, who had joined me in this portion of the work. Upon the receipt of your order on November 11, 1897, to proceed to Havana, and there continue the investigation into the cause of yellow fever, we proceeded to do so as early as practicable, all the culture material, almost entirely obtained from necropsies—little attention having been devoted to fresh-blood plantings—being carefully transferred to that city.

Our reception by the Captain-General of Cuba, General Blanco, was marked by a kindness which presaged the most satisfactory arrangements for the conduct of the investigation, and we received an early introduction into the military hospitals of Alphonso XIII, that at Regla, and that of St. Ambrosio. Owing to unavoidable delays, the laboratory installation was not completed until near the middle of January, 1898, and from this time until our work was discontinued, on March 16, by your direction, the number of cases of yellow fever was very limited. It was during this period that opportunity was had to thoroughly examine the cultures obtained in the United States. Here I must state that an impetus had been given the matter of etiologic investigation by the *Annales de l'Institut*

Pasteur for June, 1897, of the claim by Prof. Guiseppe Sanarelli, of the University of Montevideo, Uruguay, that he had discovered in his bacillus icteroides the cause of this disease.

The semidetermination of Dr. G. M. Sternberg, U. S. A., that the bacillus X (*Bacillus cuniculicida Havaniensis*), discovered by him in 1889, was the cause of this fever, had been withdrawn,¹ and the claim of other discoveries negated,² so that it was incumbent upon us to at once ascertain whether the organism which Sanarelli described, the bacillus icteroides, was to be found in the cultures made by me in New Orleans, and, if so, to ascertain, by comparative necropsies, performed upon bodies of those dead from disease other than yellow fever, whether this new organism had been overlooked, or not detected by Sternberg in his justly celebrated work in this field, since he had declared that there was nothing in the blood or organs of yellow-fever patients which he had not detected. To this end each case necropsied at New Orleans was patiently and thoroughly plated from young bouillon cultures from the original and subsequent plantings, these originals having been taken from blood, spleen, liver, and kidneys, the portions of organs in many cases having been incubated twelve hours prior to the inoculation of the tubes, as advised both by Sternberg and Sanarelli. Besides these cultures, those taken from living patients at the isolation division of the Marine-Hospital detention camp at Fontainebleau, Miss., were also carefully examined. It was from the blood of one of these cases, "Goodrich," planted on September 28, 1897, that the most typical forms of colonization, to those described by Sanarelli for bacillus icteroides, were noticed, of a small rod, actively (at first) motile; not retaining the stain after Gram; but which later in New Orleans gave rise to the production of indol and the formation of gas with both glucose and lactose. This organism, as at first noted, more nearly resembled that of Sanarelli than any other isolated at the time we left the laboratory at New Orleans, and it was now taken up for more careful observation than had been then possible. For unanimity of purpose it was thought best that each of us should prepare, independently, cultures of each and every specimen on hand, and carry them to a definite termination, a decision which afforded much satisfaction at the termination of the tedious and exacting labor of plating and replating so large a number of organisms, in that while we succeeded in a number of cases in detecting the organism in both sets of cultures, it occasionally occurred that it was found by only one of us in a special one. It is gratifying to say that the organism was readily and quickly isolated by both of us from the "Goodrich" cultures since the contamination which shrouded its fine characteristics in regard to gas and indol production was a simple colon bacillus. This was, therefore, the highly motile organization first noted by me at Ocean Springs, and which could only have been that of Sanarelli, or as was feared, one of the proteus family, and therefore the earliest Sanarelli organism isolated after that author. Early in our effort to detect this new bacillus it was ascertained that its symbiosis with any member of the colon group materially influenced its marked motility, the germ seemingly becoming inhibited by the product of the colon organism both in growth and motility. Bearing this in mind it became an easier matter to detect it, and it was my fortune to isolate it from the cultures on hand in 42 per cent.³ Concomitantly with this work it was my especial effort to determine whether the bacillus icteroides was to be found in the blood or organs of bodies dead from other diseases than yellow fever, and for this purpose I conducted at the city morgue, and more frequently at the morgue of the Hospital de Alphonso XIII, a number of necropsies (21), selecting bodies of patients who had suffered from malaria, with no suspicion of specific yellow fever, or from dysentery. With the exception of necropsy No. 6, none of these gave an organism approaching in

¹ Report on yellow fever; Sternberg, 1890, U. S. M. H. S.

² Idem.

³ A smaller per cent than if fresh culture examinations had been possible.

characteristics that of Sanarelli, the majority of cases giving an admixture of colon and proteus in variety.

In this exception the organism isolated so fully met the demands of Sanarelli, in regard to its growth and physiologic aspects, that it was thought the bacillus had been found in this case of simple camp dysentery until on the fifteenth day it was found to be quite slowly liquefying gelatin 20 per cent in combination with 1 per cent agar. Further plating in effort to eliminate any contamination to which such liquefaction may have been due was prevented by our departure from Havana. I could not differentiate the organism from that of Sanarelli when compared in living culture, or in stained preparation under the microscope, and it differed widely from the slowly liquefying proteus organisms. Its influence upon animal life I had no opportunity to test. During this time we had received notification of, and invitation to see, five cases of so-called yellow fever—one through the courtesy of a private practitioner and four in military hospitals. Of these I differed in the diagnoses of two, the one in private hospital and one at the military hospital in Regla, a suburb of Havana. In the three others I concurred in the diagnosis. Fresh blood from the carefully cleansed ear tip was taken in sterile glass bulbs, from each case, after the manner of Sternberg, the capillary tube being at once sealed hermetically. It is a matter of moment that in each of the cases which I had diagnosed as yellow fever, the organism was found by both of us, and fortunately in the one in which I failed to detect it, it was detected by Dr. Geddings, and vice versa. In the two not thus diagnosed it was detected by neither of us, although especial effort was made to do so. While I do not wish to anticipate a collaborated report of the technical work performed in the laboratory at Havana, I will briefly state that from the organisms isolated by us from the home and foreign cultures we demanded an absolute compliance with all the requirements of Professor Sanarelli in the case of his bacillus icteroides, as follows: An indefinite growth upon gelatin without its liquefaction; the same in sterile milk without precipitation of its casein; the nonproduction of gas from the decomposition of sugar, glucose, or lactose, in bouillon (here it will be mentioned that all sugar tests were made with bouillon from which all muscle sugar had been extracted by a growth of bacillus coli communis for a suitable time, for in this it was found that bacillus icteroides, as obtained from the Institut Pasteur and from our cultures, did not attack either glucose or lactose when added); the nonproduction of indol in faintest trace when dissolved by added chloroform; finally, the impossibility of inducing the property of indol production in this organism by limiting its nutriment to proteids for several successive generations. Except for its marked motility it is impracticable, otherwise, to determine the organism from the various members of the colon and proteus group. For the same reason, and because of the incompleteness of most of the observations and experiments, so suddenly interrupted and not yet resumed, I can only allude to the validity of the claim made by Professor Sanarelli, that the bacillus icteroides is the cause of yellow fever. My failure to find it in control necropsies, with the uncertain exception of necropsy No. 6; the fact of its presence in 42 per cent of native cases, as evidenced by ourselves and by Professor Archinard,¹ of New Orleans, as well as that of its more constant presence in foreign cases in the possibility of 100 per cent, make this organism and the claim made for it a most important one, and while there may be some reasons for an admission of the claim, it was the opinion of your commission, at the time of the interruption of its work, that it would require much time and labor in technical details to determine its true rôle in the pathogenesis of yellow fever.

It is a matter of serious regret that it was not considered of sufficient importance at the Bureau for this technical work to be at once continued in our service laboratory at Washington, in which event it would have been possible to have fin-

¹ Personal statement of a large per cent.

ished it, or nearly, so that a more detailed report could have been made. As stated, this is intended only as a general report, showing the scope of and the amount of work performed by your commission in Havana, at times under conditions of excitement and apprehension but little calculated to produce that mental repose so necessary to such work.

In conclusion I must state that our Service is deeply obligated to Gen. Fitzhugh Lee, our consul-general at Havana, for counsel and advice and assistance at all times during our stay in Havana, for it was mainly due to his urbanity and acceptability to the Spanish authorities that we were the recipients of so much courtesy from Captain-General Blanco and Secretary-General Congosto. The courtesies of General Pansano and of Colonel Marino, of the medical staff, were gratefully received. I must add my intense satisfaction in and thorough appreciation of the collaborative work performed by P. A. Surg. H. D. Geddings, whose versatility was often evinced in the conduct of the work.

EUGENE WADDIN,
Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE HOSPITAL SERVICE.

REPORT OF P. A. SURG. H. D. GEDDINGS.

—WASHINGTON, D. C., *November 1, 1898.*

SIR: In presenting this preliminary report of the part taken by me in the investigation into the causes of yellow fever, I would beg leave to enter briefly into a review of the question up to the time that I entered upon the work in New Orleans and subsequently in Havana, Cuba, by your direction.

It is perfectly natural that a disease so well marked in its gross pathology and clinical history should, from a very early time, have afforded a field for minute investigation long before the time that the discoveries of Pasteur, Koch, and others changed the "germ theory" of disease into a system. With the advent of means of more correct investigation, with the discoveries of the specific cause of other infectious diseases as a guide, it was perfectly natural that a disease at once so peculiar and possessing so much interest for a large portion of the Western Hemisphere should form the subject of devoted study both in the United States and in Europe.

The alleged discoveries of Babes, Gibier, Domingos Freire, Carmona y Valle, and others have passed into almost oblivion, after having excited acrimonious controversy, and having been proved to be largely errors of interpretation, due mainly to faulty laboratory technique. The labors of Sternberg were arduous, systematic, and had as a result the clearing away of many erroneous impressions, and of inviting and fixing attention on the stomach, liver, and upper portion of the intestinal tract as the probable field of future research. In the meantime much labor had been expended upon the study of the micro-organisms of the normal intestinal canal, with the result that the subject was found to be one of vast dimensions, and involving at every turn the elucidation of new problems and bringing to light heretofore small but most important differences. As an instance of this, and as pregnant with the most important facts, has been the study of the bacillus coli communis, for a long time considered as a single, well-defined, normal, and harmless denizen of the intestinal canal of man and most of the lower animals. But the researches of Booker and others demonstrated that it would be impossible longer to consider this organism as a single species, and that it must be considered one of a great group, possessing many characteristics in common, but at the same time presenting many points of difference, and these points not altogether morphological or cultural, but chemical, and consisting in many instances in their behavior to reagents and media and in the chemistry of the products of their growth. It was notably the constant occurrence of organisms of this group which has led to most of the announcements of the discovery of the specific

organism of yellow fever; discoveries which, however, did not withstand the scrutiny to which such alleged discoveries must ever be subjected.

At the conclusion of Sternberg's investigations the organism which had most attracted his attention was one isolated in Havana, possessing some of the characteristics as then known and considered of the bacillus coli communis, but lacking others, which was pathogenic to animals, and which he designated as "bacillus X."

In 1897 there were presented at the Institut Pasteur in Paris two claims to the discovery of the specific organism of yellow fever, one from Havelburg, of Rio de Janeiro, Brazil, the other from Professor Sanarelli, of the University of Montevideo, both trained observers and both pupils of the institute. Their claims were widely different, and it was obvious that one of the two claims must be rejected. This was not a matter of difficulty. Investigation showed that Havelburg had added one more to the number of those whose differentiation of the colon bacillus had not been sufficiently minute and painstaking. The claims of Sanarelli were more intricate. His theory of infection was new and elaborate, but unfortunately the percentage of cases in which his alleged bacillus icteroides was found was only slightly over 50 per cent.

Such was the status of the yellow fever question when I was ordered by you in October, 1897, to join P. A. Surg. Eugene Wasdin, United States Marine-Hospital Service, in New Orleans, and jointly with him to continue investigations into the etiology of the disease. On arriving in that city, I found that Dr. Wasdin had collected material from numerous necropsies, and there was no lack of material. Our investigations were made in the bacteriological laboratory of the medical department of Tulane University, and we received much aid and many courtesies from Prof. P. E. Archinard, who at the time was engaged on the same subject. Very early it became evident that the published descriptions of Sanarelli as to the cultural appearances of his organism were vague, indefinite, and somewhat misleading. Always associated with the colon bacillus, it was a matter of great difficulty, often of impossibility, to differentiate it from that organism. Resembling it in many particulars, it lacked certain of its characteristics, and possessed others of its own. Finally it was agreed that before an organism should be considered as that of Sanarelli it should have the following well-marked characteristics:

1. *Form*.—A small, rather fine bacillus, with rounded ends, and no tendency to fusiform shape, 1 to 2 micro-millimeters in length, and about one-fourth as broad as long, occurring singly or in pairs, but never forming long chains from culture on solid media.

2. *Motility*.—Very actively motile, with individual organisms, making decided excursions, or translations, across the field of the microscope. (In this particular the bacillus icteroides of Sanarelli differs essentially from the colon bacillus, which, while motile, is sluggishly so, while the bacillus icteroides is fully as motile, or even more so, than the bacillus typhosus.)

3. *Gas production*.—In 2 per cent lactose bouillon, not previously treated by the colon bacillus, an amount of gas production not exceeding, as compared with the colon bacillus, the proportion of 1-4. In lactose and glucose bouillon, the muscle sugar being destroyed prior to the addition of the lactose and glucose, by the growth of colon bacillus, there is absolutely no production of gas. (This is in great contrast with the colon bacillus, which produces a fermentation in both lactose and glucose bouillon, with abundant evolution of gases, having nearly or quite a definite chemical composition.)

4. *Production of acid*.—In litmus peptone solution a slight production of acid. (This is in marked contrast to the colon bacillus and the bacillus "X" of Sternberg, in which the production of acid is very marked, and much in excess of that of Sanarelli.)

5. *Production of indol*.—The bacillus icteroides of Sanarelli planted in Dunham's

peptone solution after twenty-four hours gives absolutely no production of indol upon the addition of dilute sulphuric acid and sodium nitrite. (This is in specially marked contrast to both the colon bacillus and the bacillus "X" of Sternberg, the production of indol in the latter being very abundant and well marked.)

6. The bacillus icteroides of Sanarelli does not coagulate milk. Specimens from various sources have been kept under observation in milk for as much as sixty days. (Various members of the colon group differ much in the length of time required to produce coagulation of milk. In some the change is produced in twenty-four hours; in some which have been under observation nineteen days have elapsed before the change was complete.)

It is believed that these differences fully establish the fact that the bacillus icteroides of Sanarelli, while bearing a general resemblance to the colon group in morphology and cultural appearances, differs from it widely in the products of its growth and in its production of toxines.

As I have before said, much material was accumulated in New Orleans and much time was spent in the investigation of the organs and fluids from the bodies dead of yellow fever. Special attention was also given to the study for comparative purposes of cultures of the bacillus icteroides of Sanarelli, the bacillus "X" of Sternberg, and the ordinary colon bacillus. It can be safely said that the bacillus icteroides was found in a larger percentage of cases than had been claimed by Sanarelli in his series (58 per cent). A culture which possessed much interest was one which Dr. Wasdin had isolated from the blood of a living yellow fever patient at the detention camp at Fontainebleau, Miss., and which we always referred to in conversation as "bacillus Goodrich." Subsequently its identity with the bacillus of Sanarelli was almost incontestably proved, so to Dr. Wasdin belongs the credit of having isolated and proved the first bacillus icteroides (Sanarelli) found in a genuine case of yellow fever on the North American continent.

About the middle of November, as the laboratory of the college would be required in a few days for the instruction of students, and a sufficient number of cultures from various sources having been collected, it was decided to suspend the investigations in New Orleans, and by order of the President, Dr. Wasdin and I proceeded to Havana, island of Cuba, there to continue our investigations into the etiology of yellow fever. The season of the year was a little unfortunate, as, owing to the almost entire cessation of immigration into the island on account of the war, there was very little fever in the city, and with the strained political relations existing between the United States and Spain, it was difficult to get access to the various military hospitals of the city, in spite of official promises. The time, however, was by no means wasted. A laboratory was established in the same building with the United States consulate, and here the cultures collected in New Orleans were systematically studied, and such material as could be acquired in Havana was at the same time investigated. Unfortunately the New Orleans cultures had suffered from transportation and from delay in getting our work started, so they were comparatively few in number. The results, however, may be stated in brief as follows:

	Examined.	Positive.	Negative.
Cultures from—			
Spleen	2	2	0
Liver	8	6	2
Kidney	1	1	0
Blood	1	1	0
Havana cultures from blood	4	3	1
Total	16	13	3

NOTE.—The following is offered in explanation of the above results: There were originally 24 cultures secured in New Orleans and carried to Havana. On arrival there it was found that

some had been broken in transportation, some had perished from drying, and all of these were rejected and no work was done on them in Havana. Surgeon Wasdin has also called my attention to the fact that the results in one case, necropsy No. 18, were not quite conclusive and must to a certain extent be reworked.

Making a percentage of 81.25 in which the organism described by Sanarelli was found. Of course it would have been desirable to have had a larger number of cases, especially in Havana, but I think it will be conceded that a small number of cases carefully and exhaustively studied have more scientific value than a larger number more cursorily examined.

Experiments had been begun upon the toxines of the bacillus icteroides, both precipitated and liquid, when it became necessary to suspend the work in Havana and return to the United States, on the 15th of March, 1898, since which time further investigation has been prevented by other duties in connection with epidemic work in the Southern States.

It is here necessary to say a few words in connection with the claim of identity of the bacillus icteroides of Sanarelli and the bacillus "X" of Sternberg, which has recently been made. It is inconceivable to my mind how such a claim can be sustained by anyone who has carefully studied and differentiated the two organisms. The bacillus "X" is coarser, longer, and stouter than the bacillus icteroides. Originally quite motile when isolated in Havana several years ago, it is now an organism hardly as motile as the ordinary colon bacillus. In its growth it produces fermentation in both lactose and glucose agar, with a gaseous product quite similar in composition to the products of the colon bacillus; it produces acid in its growth; its production of indol is well marked and excessive, and, lastly, it readily coagulates milk. Indeed, it would seem that the bacillus "X" is simply and solely a well-marked and accentuated colon bacillus. It is pathogenic, to be sure, for rabbits, guinea pigs, and other of the lower animals; but the time has long since passed when the colon bacillus can be considered as harmless and nonpathogenic.

It has also been objected that the bacillus icteroides too closely simulates the colon bacillus. To this it can only be said that in its characteristics of growth, as previously detailed in this article, there is a wide difference, nor is its similarity nearly so great as is that of the bacillus typhosus to the bacillus coli communis. The bacillus icteroides (Sanarelli) produces toxines, precipitable by ammonium sulphate, of well-marked intensity and potency, much more so than the toxines precipitated from bacillus "X" and ordinary colon bacillus.

The agglutination and arrest of motility experiments of Archinard and Woodson would seem to make the argument in favor of the pathogenicity of the bacillus icteroides all the stronger.

In concluding this preliminary and independent report which would indicate that the bacillus icteroides of Sanarelli is the specific agent in the causation of yellow fever, I would beg to recommend that opportunity be given for further experimentation on lower animals with its toxines, and with cultures if necessary, and that both be tested in connection with the anti-amaryllic serum prepared according to the methods of Sanarelli.

Very respectfully,

H. D. GEDDINGS,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT OF TESTS MADE IN LOUISIANA IN 1898 IN THE USE OF PROFESSOR SANARELLI'S SERUM ANTIAMARYLLIC AS A CURATIVE AGENT IN YELLOW FEVER.

The work of the commission in Havana having been interrupted by the war, Surgeon Wasdin was directed to proceed to New Orleans and other places infected with yellow fever in September and October of

the present year to test the value of the anti-*marial* serum of Professor Sanarelli as a curative agent. Surgeon Wasdin had previously been sent to Santiago for the same purpose, but found no material for the prosecution of his tests and was directed to return to the United States.

Following is his report of the tests made in Louisiana:

WASHINGTON, D. C., *November 1, 1898.*

SIR: Under your instructions to proceed to New Orleans, La., of September 26, 1898, to endeavor to obtain cases of yellow fever in which to use the serum, I called upon the authorities of the Charity Hospital on October 1, and upon those in charge of Tauro Infirmary in that city, and made known to them your earnest desire to have granted us the privilege of visiting cases of this disease in those institutions and of using the serum in those we thought suitable, this to be done only in consultation with the attending physician.

Prof. Ernest Lewis, vice-president of the board of regents of the Charity Hospital, after consultation with the superintendent of the institution, informed me that it was thought best to refuse your request on the ground that a test of the same serum presented to the institution by Professor Sanarelli was then in process, and that the limited number of cases in hospital scarcely furnished material for this test.

The authorities at the Tauro Infirmary, especially Dr. Loeber, promised every facility for the use of the serum, manifesting a lively interest in the subject. At the same time they informed me that a definitely marked case of yellow fever was very rare in their hospital; that the prevailing type was so poorly marked, so slightly developed, that often it was found necessary to rely upon the fact of the presence of the disease in the community for a diagnosis. All such cases were treated very tentatively, scarcely any medicine being demanded, and in these it was thought there could be no definite results gained from serum exhibition, since they invariably recovered. Such were the cases then on hand. But I was promised instant notification of any admission of a serious type, and preparation was made to respond to such calls.

Consultation with Surgeon Carter, senior surgeon at New Orleans, on October 8, no suitable cases having been admitted to the Tauro Infirmary, decided me to seek at Wilson, La., then generally infected, cases in which to test the prophylactic influence of the serum, and I proceeded there on that date. In this village of some 600 people I found the majority of the population sick or convalescent from a very mild type of fever, so much so that there seemed but little evidence of alarm. Through the courtesy of Acting Assistant Surgeon Bland, Marine-Hospital Service, I saw a number of these cases, and he and other local physicians soon acquainted the people with the object of my visit. There was evidence of an indisposition to be "experimented" upon and many declined "the South American treatment." Of those who had been exposed, and who would probably develop the disease, there were three or four who expressed a disposition to submit to the prophylaxis, but they invariably asked for a guaranty, and when this could not be given they hesitated between the unknown remedy and the light type of the disease.

However, two cases of tolerably well developed yellow fever were found willing to receive the serum treatment, and these are detailed below. In the second case the use of the serum was followed by such an annoying urticarious erythema, especially after the second injection, that the apprehensions of the family were aroused, and the fact of the new treatment having produced symptoms not seen in any other cases, and of so serious an appearance, immediately became the

subject of general comment, and I quickly found the serum relieved of all sympathy and invested with unknown possibilities for harm. I could get no consent to its prophylactic use.

At this time advice from Surgeon Carter directed me to Baton Rouge, La., where fever was then very rapidly spreading, and by invitation of Dr. C. McRea I visited that city on October 12, meeting and discussing with a large number of the physicians the probability of being able to use the serum. There was an expression of the liveliest interest in the subject and a disposition to render me aid, but a general conviction that they were scarcely warranted in advising the use of the serum in view of the very simple nature of the prevailing disease. In those cases developing more serious symptoms it was not deemed best to rely upon the serum. Hoping that cases might have occurred in the Tauro Infirmary at New Orleans, I returned to that city, and, although there had been and were none suitable in that institution, I had the opportunity to see one at the United States Marine Hospital under the care of Dr. Faget. This is detailed below.

Case No. 1.—R. A.; aged 50 years; a vigorous man, was taken sick at 10 p. m., October 8, 1898, with intense pain in back and limbs and a severe rigor, followed by high fever. When seen at 4 p. m. of the 9th in consultation with Dr. Bland, the typical facies, pains, and commencing icterus left no doubt that he had succumbed to the infection to which he had been freely exposed. Thus far only a mild mercurial had been prescribed, and with his consent the antiamarylic serum was used. At 6.15 p. m. 10 c. c. of serum were injected into the connective tissue of the loin; pulse 84, temperature 38.7° C.; much congestion of vessels of skin and face. Temperature taken every two hours as nearly as practicable, as follows:

Time.	Temperature	Pulse.	Remarks.
	° C		
October 9—			
9 p. m.	39	86	More marked flushing of the face, and some sweating.
11 p. m.	38.8	84	Semidelirious and perspiring very freely; urine free.
October 10—			
1 a. m.	38.6	81	Sleeping.
3 a. m.	38.4	78	Quiet.
6 a. m.	38.1	76	Urine free.
8 a. m.	37.8	66	Do.
9 a. m.			10 c. c. of serum were injected into the connective tissue of loin.
10 a. m.	37.6	70	Congestion of face.
3.40 p. m.	38.3	78	Sweating profusely.
5.45 p. m.	38.5	78	Urine free.
7 p. m.	38.6	78	
9.30 p. m.	38.5	74	Restless.
11 p. m.	38.5	72	Slept 1½ hours.
October 11—			
1 a. m.	38.3	74	Urine free.
3 a. m.	38.3	73	Sleeping.
5.20 a. m.	38.6	75	Feeling weak.
7.10 a. m.	37.8	70	
9 a. m.	37.7	68	Injected serum. 8 c. c.
7 p. m.	38.4	78	Urine free.
10.15 p. m.	38.2	76	Refused nourishment.
October 12—			
3 a. m.	38.1	76	
6 a. m.	38.1	72	Slept well.
8 a. m.	37.8	75	Urine free.
5 p. m.	38	70	
9 p. m.	37.6	68	Bowels free.
October 13—			
1 a. m.	37.4	68	Urine free.
6 a. m.	37.2	62	Takes food.
6 p. m.	37.3	62	Well.
October 14—			
7 a. m.	37	64	
6 p. m.	37	68	Discharged.

Case No. 2.—F. A.; aged 19; a healthy young man, son of preceding patient, and much exposed to the infection, was taken sick at 6 p. m. of the 9th of October, 1898, with a hard chill; pain in back and limbs, intense headache and nausea.

He received a mustard bath and a mercurial with phenacetin. Temperature ranged from 38.5° to 39.5°, pulse 115. Temperature and pulse varied as follows:

Time.	Temperature.	Pulse.	Remarks.
October 10—	° C.		
9 a. m.	39.3	110	Given 12 c. c. of serum under the skin.
10 a. m.	39.6	110	Marked congestion of face, lips, ears, and body.
12 m.	39.6	110	
3.40 p. m.	39.6	110	
6 p. m.	39.2	114	Perspiring.
8 p. m.	39	96	
11 p. m.	38.9	98	Slept well.
October 11—			
1 a. m.	38.7	96	
3 a. m.	38.5	88	
5 a. m.	38.9	98	Complains of much dizziness.
8.30 a. m.	39	100	Given another 12 c. c. of serum under the skin.
9.30 a. m.	39.3	100	Congestion of the face was extreme, and there was marked erythema.
12 m.	39.5	105	Perspiring and pyalism.
4.30 p. m.	40	110	Hastily summoned, and found the patient suffering extremely from the urticarious rash; face puffed and congested; urine abundant, copious saliva.
6 p. m.	39.6	110	Phenacetin given.
8 p. m.	38.8	102	Nausea.
10 p. m.	39	104	Vomiting.
12 m.	39.6	110	Rash disappearing.
October 12—			
2 a. m.	39.3	105	Urine scant.
4.30 a. m.	39.3	105	Slept well.
6 a. m.	39.3	110	
9 a. m.	39.3	97	Perspiring.
11 a. m.	39.4	110	
1.30 p. m.	38.8	106	
5.30 p. m.	39.4	90	Urine scant.
7 p. m.	39.3	98	
9 p. m.	39.4	98	
October 13—			
12.30 a. m.	38.3	88	
4 a. m.	38.1	81	Slept well,
6 a. m.	38.4	86	
8 a. m.	38.5	83	
10 a. m.	38.8	82	
12 m.	38.8	85	
2.30 p. m.	38.8	82	
6 p. m.	38.7	83	
8 p. m.	38.4	82	Nauseated.
12 m.	37.8	78	
October 14—			
4.30 a. m.	37.6	77	
7 a. m.	37.5	76	
9 a. m.	37.5	77	
6 p. m.	37.7	80	
October 15—			
10 p. m.	37.2	78	Discharged.

Case No. 3.—A. B., seaman; aged about 35 years; was admitted to the isolation ward at the United States Marine Hospital at New Orleans, October 13, 1898, and when seen in consultation with Dr. Faget was moribund from almost fatal suppression of urine. He was unconscious; there was hiccough and jactitation, small weak pulse, devoid of tone. In the hope that the serum would produce a renewal of the suppressed renal function, he was given 20 c. c. serum under the skin, and although there was noticed a slight reaction in temperature from the sub-normal, the kidneys did not react, and he died of a uræmic seizure twelve hours after the administration.

One word as to the possibilities of this serum as outlined by Professor Sanarilli. Because of its not being an antitoxin it does not tend to overcome the toxins of yellow fever produced in the system, and depends for its curative and prophylactic properties upon its germicidal influence. Hence it is argued by Professor Sanarilli that its use will be absolutely negative in cases in which an amount of toxin has been produced sufficient to destroy life. These cases he does not attempt to treat, passing them by as out of the pale of serum influence. To those who have

witnessed the successful struggle of many apparently beyond prognostic hope, there will at once arise the question of properly determining in such case the fatal degree of intoxication which exists. Therefore Professor Sanarilli advises and insists upon the early use of the serum, and thus the destruction of the organism before it has elaborated the fatal proportion of its toxin. Such an exhibition of the serum invites the criticism that the mortality rate must be that of selected cases and therefore of diminished statistical value, and in an epidemic of mild type, such as the recrudescence of this fall in Louisiana, it would be contradicted.

As to its influence in case No. 1, there was no doubt a very prompt reaction evidenced by the rise of temperature and pulse, and the great congestion of the face and skin of body. This was followed by a cessation of all pain in a few hours, and a fall of pulse and temperature to a point lower than before the administration. The second and third injections showed less marked reaction. The exhibition of the serum produced a free flow of nonalbuminous urine, some ptyalism, and free perspiration. I am free to confess that the man would have done equally well with any ordinary medication.

In case No. 2 I am satisfied that the boy would have done as well without any medication. His mental and physical condition were not improved by its use. The influence of the serum upon the vaso-constrictors was very pronounced, and caused mental and physical suffering. At first the urine was quite free, and always nonalbuminous, but on the second day became more scant, yet the skin acted very freely. The rash was very general on trunk and limbs. The face, eyelids, and ears were swollen, puffed, and bluish in color, with slightly raised patches which resembled urticaria, the general surface being erythematous with scattered and intensely itchy plaques. The reaction in this case was excessive, the temperature rising to 40°. The family requested us to desist from this treatment, and I did not object, since the pulse was intermittent and dicrotic. As to the doses in these cases, I had never observed the action of the serum, and therefore refrained from the exhibition of the full dose directed by Professor Sanarilli, that of 20 c.c., and feel satisfied that the latter dose would have caused much alarm and probably harm in the second case reported. I regret that I have not been able to accomplish your purpose to have a full test made of this serum, but I realized that it was more highly necessary to arrive at a just conclusion of its merits, based on correct data, than merely to use it on uncertain cases. A more thorough test will be made at the earliest opportunity.

EUGENE WADSWORTH,
Surgeon, M. H. S.

SURGEON-GENERAL MARINE HOSPITAL SERVICE.

SMALLPOX.

SMALLPOX IN THE UNITED STATES.

At the beginning of the fiscal year 1898 smallpox was but little disseminated over the United States, the advent of the warmer weather and the consequent diminution in the risk from overcrowding in close quarters illy ventilated, etc., producing its usual result in the abatement of this disease.

At that time the reports showed that variola existed—a few cases only—at but four localities, and in but three States, New York, Tennessee, and Alabama. It was only in the latter State, at Birmingham, that there was anything resembling in the least an epidemic. Here there had been smallpox since the 8th of May, 1897, and from that date to August 12, 1897, there had been a total of 96 cases.

The close of the fiscal year, however, shows that during the twelve months intervening variola had existed and had been reported in 24 States and Territory and in the District of Columbia, viz: Alabama, Arkansas, Colorado, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Massachusetts, Michigan, Mississippi, New Jersey, New Mexico, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, and Wisconsin. In these 24 States a total of 151 localities appear to have been infected, some to an epidemic extent—notably in Alabama.

LOW MORTALITY DURING 1898.

The most interesting feature of the smallpox outbreaks of this year has been the universally low rate of mortality. Local epidemics with no deaths were not uncommon.

Asst. Surg. Hill Hastings, at the time of reporting on the smallpox epidemic at Middlesboro, Ky., from which report this quotation is taken, states as follows in commenting on this low death rate:

Throughout the epidemic the disease maintained the mildness so characteristic this year of epidemics of smallpox in other localities. The prodromic symptoms were slight, usually without a chill, the eruption was almost invariably of the discrete type, the fever low and often absent, and the complications few, consisting chiefly of an occasional abscess.

The following statistics show how marked this mild type must have been, as so few deaths occurred:

In Jefferson County, Ala., in which is situated the city of Birmingham, there were from August, 1897, to January 4, 1898, the date on

which this Service assumed charge of the epidemic measures at that point—405 cases, with only 15 deaths; and altogether, from August, 1897, to March 10, 1898, there were 759 cases, with a mortality of 3.16 per cent. Only 23 whites had the disease out of all this number. During this same outbreak there were 43 cases in the city of Talladega, 40 miles east of Birmingham, with no deaths.

In Bartos County, Ga., during the same period, "about" 200 cases, with 2 deaths.

At Pinckard, Ala., from August 15, 1897, to February, 1898, 50 cases, with no deaths.

The same fact is striking in the epidemic from which Atlanta suffered during the early winter. From August 21, 1897, to February 16, 1898, there were 319 cases, with only 7 deaths.

The epidemic at Middlesboro, Ky., to which I referred above, shows a total of upward of 169 cases, with only 2 deaths, previously to the Service taking control at that point. After that date there were 103 cases treated in the smallpox hospital there with not a single death.

The epidemic in Pulaski County, Ark., shows exactly the same remarkable rate of mortality from a disease which has been the cause of such numberless deaths. Here, up to May 20, 1898, 110 cases had occurred and there was only 1 death among that number. That this low mortality obtained last year among colder climates than that of the localities referred to seems evident, from the outbreak in New York State in April and May of this year. During this small epidemic, which was spread by a traveling show, eleven localities became infected, and a total of 50 cases were reported with no fatalities.

Following is the report of the secretary of the State board of health of New York on these cases:

SMALLPOX IN NEW YORK STATE.

ALBANY, N. Y., *July 7, 1898.*

SIR: I am in receipt of your communication of the 6th instant, requesting a complete list of localities in this State where smallpox has existed since January 1, 1898.

In reply, you are informed that a traveling troupe entered this State in the latter part of April, 1898, appearing in the following places on the dates named: April 28, Westfield; April 29, Fredonia; April 30, Lockport; May 1, Buffalo; May 2, Mount Morris; May 3, Dansville; May 4, Bath; May 5, Corning; May 6, Waverly; May 7, Binghamton; May 8 and 9, Norwich; May 10, Oxford; May 11, Greene; May 12, Whitney's Point; May 13, Marathon; May 14 and 15, Cortland; May 16, Groton; May 17, Moravia; May 18, Union Springs; May 19, Ithaca; May 20, Trumansburg; May 21, Geneva.

One of the troupe having been found to be suffering from smallpox while at Ithaca, the patient was quarantined and the troupe allowed to proceed to Geneva, where, upon their arrival, the whole troupe was quarantined on account of smallpox existing among the members.

Since the quarantine 50 cases of smallpox have developed in localities visited by the troupe, as follows: Ithaca, 1; Geneva, 6; Buffalo, 1; Moravia, 3; Dansville, 3; Locke, 1; Union Springs, 2; Westfield, 3; West Sparta, 2; Rochester, 3; Fredonia, 25.

None of the above cases have proved fatal, and the disease has disappeared from Locke, Geneva, Ithaca, Buffalo, and Rochester.

Very respectfully,

BAXTER T. SMELZER,

Secretary State Board of Health.

SURGEON-GENERAL, MARINE-HOSPITAL SERVICE.

COOPERATION WITH STATE AND LOCAL BOARDS OF HEALTH IN THE SUPPRESSION OF SMALLPOX EPIDEMICS DURING 1898.

On account of the prevalence of variola in some of the States, and the inability of local authorities to successfully prevent its spread, as well within the limits of the infected cities as to other points in the same or neighboring States, the Service was asked for aid by the State authorities, and in the case of Birmingham, Ala., and adjacent towns and Middlesboro, Ky., assumed complete control, while at many other points officers of the Service investigated, under my orders, reported outbreaks of variola, and, in consultation with the local health officers, outlined quarantine measures for the suppression of the spread of the disease.

The reports of the officers conducting such quarantine measures and investigations are herewith appended.

REPORT ON THE EPIDEMIC OF SMALLPOX AT BIRMINGHAM, ALA., AND NEIGHBORING LOCALITIES.

Toward the close of the year 1897, the epidemic at Birmingham and vicinity, which had been increasing since the first case in May, 1897, had assumed such alarming proportions, and the efforts to check the increase of the disease had been so unavailing, that Government aid was felt to be a necessity, and late in December, 1897, this Service received requests from the mayor of Birmingham, Ala., from the State health officer, and from the governor of the State for aid by the Service in suppressing smallpox at that point. Accordingly on the 31st of December, P. A. Surg. G. M. Magruder, then on duty at Memphis, Tenn., was ordered to proceed to that point, investigate, and make full recommendations.

The following is his report:

BIRMINGHAM, ALA., *January 4, 1898.*

SIR: In obedience to your telegraphic order of December 31, I reached this city to-day, and after a visit to the quarantine hospital in company with Mayor Evans and City Physician Wilder, I inquired as thoroughly as the limited time would allow into the existing status of the smallpox epidemic.

The quarantine camp is located $3\frac{1}{2}$ miles from the city and consists of one ward, 20 by 100 feet; two buildings of four rooms each (room 16 by 18 feet); a small kitchen and storeroom, and three or four wall tents. The buildings are badly constructed, of the worst material, and are all overcrowded. About one-half mile from the quarantine hospital is located Camp Evans, in which persons who have been exposed to infection or who had not been vaccinated prior to exposure are detained sixteen days before being discharged. They are housed in a frame building 20 by 40 feet, and a smaller building is used as kitchen and quarters for guards. Both camps are under the general control of Dr. Wilder, city physician,

who visits them daily. An undergraduate in medicine is in immediate charge at each camp.

The disease has existed here in epidemic form since the middle of July, and the total number of cases to date is 406; total number of deaths, 15; total number treated in camp, 375; total number treated at home, 31; total number now in camp, 85.

Most of the cases have been discrete, and the low mortality will show how mild the disease has been.

Jefferson County, in which Birmingham is situated, comprises about 900 square miles and contains a population of about 110,000. Half of this population resides in Birmingham and the remaining half in mining camps and towns, varying in population from 50 to 10,000, scattered over the county. The negroes, to whom the disease is almost exclusively confined (only about 8 to 10 whites having contracted it) here, as elsewhere, are the great carriers of infection. Essentially itinerant, they travel from mining camp to mining camp, from town to town, and carry the disease with them, so that during the month of December cases were reported from 21 towns and camps and in the county, and adjacent counties are also reported as infected, though statistics from these are not at hand. Vaccination is compulsory and has been quite thoroughly practiced in Birmingham, I am informed, but in the county it has been more or less neglected, and as a result the disease, while diminishing somewhat in Birmingham, especially during the latter weeks of December, is increasing in the county towns. Exhibit A will show the cases occurring in Birmingham and the county monthly since July, while Exhibit B gives cases occurring weekly during December, and also shows the towns in the county in which they occurred.

Jefferson County, with the towns and cities within its limits, including Birmingham, is under the sanitary control of the county medical society, which is, by State law, the county board of health, and the request for Service aid is not for Birmingham alone, but for all the towns within the county limits.

The local authorities have expended all available funds and are now anxious for the Service to assume entire control and bear all the expense.

In accordance with your instructions, I informed the mayor that if the Service took charge the camp would have to be enlarged by the erection of two more wards 30 by 80 feet, and other buildings which I specified, the camp equipment completed, and the bedding, etc., destroyed in disinfection, replaced at the expense of city and county; that the Service would bear the expense of administration only. He replied that he had no doubt the board of aldermen and county commissioners would agree to this, and a meeting would be called to-morrow to consider the matter.

In case the Service should take charge, I would recommend that a house-to-house inspection of the city be made at once; all cases of smallpox be moved to the quarantine hospital or kept under guard, and persons exposed to infection who have not been vaccinated successfully be removed to Camp Evans or kept under daily observation (the State laws do not permit forcible removal of patient or suspect from his home provided he pays cost of guard), and infected houses be immediately disinfected. In order that this be done as quickly as possible I recommend the employment of about 30 inspectors, at a cost of \$4 per day; 3 physicians, at a cost of \$8 per day and expenses, 1 of whom shall be located at camp and the remaining 2 shall superintend disinfection of houses and examine and diagnose all cases of sickness reported by the inspectors.

As inspectors, I propose to employ a number of second-course medical students, some of whom have already been employed in this work by the city authorities, and who shall examine vaccination marks of all persons as they inspect, and vaccinate where necessary.

My time will be occupied at first in organizing camp and instructing inspectors and disinfectors in their various duties, and as soon as possible I would suggest that I visit (if I am kept in charge) the remaining infected points, and either pursue the same course or follow whatever plan seems best; and it is to aid in this work that two or three regular officers could be employed to great advantage, especially as I am informed that adjacent counties will probably soon call on the Service for aid. One regular office should also be stationed at camp. Two stewards will be needed, one at camp and one in town to keep accounts and in looking after the inspectors, and, if need be, to take charge of the house disinfection. Many of the stewards, especially those who have had quarantine experience, could be more easily taught than an inexperienced physician, are better disciplined, and would cost less.

From the above, it will be seen that owing to the numerous and widely disseminated foci of infection, the itinerant character of the negro, his dread of vaccination, and the danger of reinfection from adjacent counties, the work is one of unusual magnitude and difficulty.

Very respectfully,

G. M. MAGRUDER,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

[Inclosures.]

EXHIBIT A.—*Cases of smallpox occurring in Birmingham and Jefferson County during the following months.*

Month.	Cases occurring in Birmingham.	Cases in the remaining cities of Jefferson County.	Month.	Cases occurring in Birmingham.	Cases in the remaining cities of Jefferson County.
1897.			1897.		
July	64	0	October	0	8
August	85	33	November	26	34
September	24	4	December	38	108

EXHIBIT B.—*Cases of smallpox occurring in Birmingham and other cities of Jefferson County during December, 1897.*

Places.	Week ended—					Total.	Estimated population
	Dec. 7.	Dec. 14.	Dec. 21.	Dec. 28.	Dec. 31.		
Birmingham	13	13	3	5	4	38	50,000
Blossburg	3	4	4	2	0	13	1,000
Pratt City	2	5	2	6	1	16	6,000
Woodlawn	5	1	5	0	0	11	3,000
Smithfield	1	0	3	0	0	4	
Bessemer	1	0	0	2	0	3	10,000
Dolomite	1	0	0	0	0	1	
Enon Ridge		9	8	5	1	23	
Horn Creek		1				1	
Alice Furnace		1	0	0	0	1	
North Birmingham		1			1	2	500
Brighton	1		1	2	1	5	500
Gate City			1	2		3	
Ensley City			1			1	2,000
Fountain Heights				1		1	
Newcastle				1		1	
Ishkooda				1		1	
Warrior				1		1	3,000
Woodward					10	10	1,000
Mary Lee	6					6	300
Leeds	4					4	
Total	27	35	28	28	18	146	

[Telegram.]

BIRMINGHAM, ALA., *January 6, 1898.*

Visited Bessemer to-day: 42 cases to date: 20 now in pesthouse, 11 reported during past week, 2 to-day: vaccination not compulsory, but will be made so. Population poorly protected by vaccination. Several large mines employing several thousand negroes in radius of three miles: few vaccinated. All camps infected: 3 cases to-day in Birmingham. Will report decision of city council to-morrow.

MAGRUDER.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

The general course of action as outlined in the above letter having been approved, the transactions of the Service at this and neighboring towns and cities are herewith reported by Passed Assistant Surgeon Magruder and other detailed officers.

SMALLPOX IN BIRMINGHAM AND VICINITY.

BIRMINGHAM, ALA., *January 26, 1898.*

SIR: I have the honor to give a brief report of the operations of the Service in Jefferson County during the present smallpox outbreak, which lack of time has heretofore prevented.

On January 8 official notification was received by me of the acceptance, by the authorities of Birmingham and Jefferson County, of aid as tendered by yourself, and on the following morning work was commenced in this city with 30 inspectors.

Each inspector was assigned a certain territory, varying in extent from four to eight blocks, according to population, and was instructed to make a house-to-house canvass, entering in a notebook the address of each house visited, names of all inmates of each house, date of last vaccination of each individual, whether or not such vaccination was successful, and to revaccinate all persons who had not been successfully vaccinated within the last year, as evidenced by an examination of the scar in each case. Each room in every house was to be visited, especially in the negro quarters, where smallpox was most prevalent, and a thorough search of the premises made for cases that were being concealed.

As the principal method of the spread of the disease seemed to be through negro miners, who constantly pass from one mining camp to another, and as these men usually object to vaccination and are not within reach of city ordinance, an attempt was made to secure cooperation of the mine owners and superintendents. A meeting was accordingly held on the morning of January 9 and another on the 10th instant.

These meetings were attended by men whose mines and furnaces support a population of about 40,000 persons, and they agreed to assist me in every way possible.

Notices were immediately published and posted at each mine and furnace, signed by all the firms that had entered into the agreement, stating that no person would be employed who refused to have himself and family vaccinated.

Previous to this time an attempt had been made by superintendents of different companies to enforce vaccination, with the result that the men would leave in such numbers as to cause serious embarrassment from lack of laborers, and the attempt was discontinued. As soon as they learned, however, from these notices that neighboring mines would not give them employment unless vaccinated desertion almost entirely ceased, and my inspectors have met with but little opposition in their work. Operations having been satisfactorily begun in Birmingham, I visited as rapidly as possible the remaining infected points in Jefferson County, and inspectors were detailed to carry on the work at the following

places in the manner above indicated: Adamsville, Bessemer, Blue Creek (including Johns, Sumter, and Adger), Brookside, Coalberg, Dolcita, Dolomite, East Lake, Ensley, Irondale, Ishkooda, Mary Lee, Oxmoor, Pratt City, Thomas, Woodlawn, Woodward, and Warrior, and also Talladega, in Talladega County.

A few other towns in Jefferson County will be worked in a short time. Seventy-one men are now employed here and in Talladega, and one house-to-house inspection of Birmingham, Bessemer, and Talladega will be completed to-morrow and another immediately begun.

Pesthouses have been established near Birmingham, Bessemer, and Talladega, and to these all cases from neighboring points are brought. At present they contain the following number of patients: Birmingham, 129; Bessemer, 75; Talladega, 39.

The amount of work done from January 9 to 26 by the inspecting corps will be seen from the following table:

Places.	Houses inspected.	Persons inspected.	Persons vaccinated.	Cases smallpox reported.	Houses disinfected.
Birmingham.....	7,361	31,857	9,927	29	19
Bessemer.....	3,183	10,979	5,262	78	88
Talladega.....	754	3,131	2,616	41	12
Other points in Jefferson County.....	3,453	12,845	7,237	33	25
Total.....	14,751	58,812	25,042	181	144

From the above it will appear that smallpox is on the increase, but such I do not believe to be the case. The increased number of cases, in my opinion, is solely due to the fact that the inspectors have discovered many cases that have heretofore been concealed, many of which would never have been discovered but for the thorough examination of each house.

As to the possible duration of the epidemic I can form no opinion that would be of value. Many persons have been vaccinated, but many others have evaded the inspectors. I hope, however, to see considerable improvement in the situation by the middle of February. The mayor of Birmingham, the commissioners of Jefferson County, and officials everywhere, with the exception of Pratt City, have aided and supported me in every way in their power.

Respectfully, yours,

G. M. MAGRUDER,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT ON SMALLPOX AT NEWTON AND PINCKARD, ALA.

BIRMINGHAM, ALA., *February 2, 1898.*

SIR: In obedience to telegraphic order of January 26, I have the honor to state that I visited Newton and Pinckard on January 30 and 31, and will give below the result of my investigation.

Pinckard is a town with a population of about 500 people, with probably 400 more within a radius of 2 miles. Smallpox appeared there in August, since which time about 50 cases have developed in the town and vicinity; about 25 cases in various stages of the disease are now there. No statistics are available, no record having been kept of the cases, so the above figures are approximate only and probably fall short of the true number, especially as the physicians were in doubt for some time as to the true nature of the disease. Only 1 white person has been attacked and no death has occurred. Vaccination is not compulsory and no attempt at isolation or disinfection has been made. I was informed that proba-

bly 50 per cent of the population of the town had been vaccinated, but in the suburbs very few had availed themselves of this measure of protection.

The mayor and town council have until recently manifested but little interest in the matter, and, I am informed, rejected an offer made by the county judge to erect a pesthouse and cooperate with them in taking measures to suppress the outbreak.

Newton is situated 4 miles from Pinckard and has a population of about 700. The first case of smallpox was reported January 15, and since that time 7 have appeared, all negroes. Vaccination is not compulsory and has been but little practiced. The inmates of infected houses have been ordered to remain indoors, and are fined if found upon the streets. This town, like Pinckard, has almost no funds available for quarantine purposes and looks to the county for aid. The mayor is alive to the situation, and has promised to make vaccination compulsory and appoint a physician to vaccinate free of charge.

At the request of the mayors of the two towns, I called on the county judge at Ozark and he readily agreed to build a pesthouse accessible to both localities and aid in every way possible. I advised the officials of both towns as to the methods now being employed here and suggested that they follow the same course, which they promised to do. As to the thoroughness with which it will be performed, I am not able to form an opinion.

Very respectfully,

G. M. MAGRUDER,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

BIRMINGHAM, ALA., *February 7, 1898.*

SIR: I have the honor to report considerable diminution in the number of smallpox cases occurring in this locality since the Service assumed control on January 9, as will be seen from the following table:

Cases of smallpox occurring, by weeks.

Places.	Week ended—			
	Jan. 15.	Jan. 22.	Jan. 29.	Feb. 5.
Birmingham	12	14	9	3
Bessemer	32	29	16	9
Other points in Jefferson County.....	26	10	3	6
Total	70	63	28	18

In Talladega results have been more gratifying. Service aid was asked early in the epidemic, and prompt action was taken. Work was commenced on January 18, at which time there were 37 cases of smallpox in the city. Only 4 cases have since appeared in town and 2 among the suspects in detention camp. No case has developed since January 30.

In Jefferson County cases will, I fear, continue to appear for some time yet. Smallpox having existed here in epidemic form since last July, infection is broadly scattered. Cases, also, from adjacent counties are constantly finding their way into this city and county, carrying infection with them. And as quite a number of persons will evade the inspectors and avoid vaccination, material will be furnished to keep the disease alive for some time, I fear. Moreover, the officials of a few towns have refused to make vaccination compulsory, or have failed to prosecute where such ordinance already existed, and the inspectors met with such opposition from the people that I was forced to withdraw them, after having

accomplished but little in the way of vaccination. This was especially the case in Pratt City, a town of about 3,000 inhabitants, situated 5 miles from Birmingham.

The second house-to-house inspection of Birmingham is nearly completed, and a third partial one will be made, confining the inspectors to the portion of the city inhabited by negroes. Bessemer will be worked in the same manner.

Very respectfully,

G. M. MAGRUDER.

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

BIRMINGHAM, ALA., *February 19, 1898.*

SIR: I have the honor to give below a table which will show the present status of the smallpox epidemic in this locality:

Cases of smallpox occurring, by weeks.

Places.	Week ended—					
	Jan. 15.	Jan. 22.	Jan. 29.	Feb. 5.	Feb. 12.	Feb. 19.
Birmingham	12	14	9	3	2	2
Bessemer	32	29	16	9	8	6
Other points in Jefferson County	26	10	3	6	a 17	b 9
Total	70	63	28	18	27	16

Place.	Week ended—			
	Jan. 25.	Feb. 1.	Feb. 8.	Feb. 15.
Talladega	41	c 2	d 1	e 1

a Two wandered in from Mississippi.

b One wandered in from Montgomery, Ala.

c One of these two cases occurred in suspect camp.

d This case occurred in suspect camp.

e This case occurred in person of a guard at pesthouse.

No cases having occurred in Talladega since January 30, the epidemic there may be said to be at an end until the town is reinfected.

From the first of the above table it will be seen that in Birmingham and Bessemer, where, under city ordinance, vaccination can be enforced, the decrease in the weekly number of cases has been steady. In the county, however, in some of the smaller towns and mining camps, vaccination is optional, it is opposed by the people, and, for the reasons stated in my letter of February 7, cases of smallpox, I believe, will continue to appear for some time to come. The force of inspectors has been reduced to about 20 men, and owing to the growing opposition on the part of the people they are accomplishing but little; therefore, if it meets with the approval of the Bureau, I will discontinue these as soon as the inspection now being made is completed, and unless something unforeseen should happen I will discontinue operations about March 1.

As stated in previous communications, the population of the mining camps, with which this and adjoining counties are dotted, is a very shifting one. Unvaccinated laborers are continually coming in, furnishing material to keep the disease alive, and in many cases bringing infection with them, so that, in my opinion, unless work is undertaken throughout the South, it is almost a hopeless task to attempt to stamp it out entirely and permanently, either here or in any other locality.

I have urged the mine owners to have all new labor vaccinated by their mine physicians, and though they promise to do this, the rule is in most cases a dead letter.

Respectfully, yours,

G. M. MAGRUDER.

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

SMALLPOX IN CARTERSVILLE, GA.

BIRMINGHAM, ALA., *March 1, 1898.*

SIR: I have the honor to report the completion of my inspection of Cartersville, Ga., made in obedience to your telegraphic order of February 24.

Smallpox first appeared in Cartersville about January 15, having been introduced from Stilesboro, a village 10 miles distant, and to Stilesboro it was brought from Atlanta. Nine cases have been reported to date, all negroes with one exception, and 4 are now under treatment in a pesthouse located 2 miles from the city. One death has occurred.

The city officials in meeting the emergency have acted with unusual promptness and good judgment. A compulsory vaccination ordinance was passed, the town divided into five districts, and a physician appointed to each district to visit every house and vaccinate free of charge whenever necessary, and 1,800 people have been vaccinated in this way (population of town, 3,000). The smallpox cases were isolated in this pesthouse under guard and infected clothing and houses fumigated with sulphur. No case has developed since February 22.

I advised a second house-to-house inspection, and disinfection of clothing and houses with bichloride solution (1-1000), the houses being too open and loosely constructed, in my opinion, for sulphuric fumigation to be of much value.

I was informed that about 200 cases of a disease called "swinepox" by several local physicians had occurred in the county (Bartow County), and was asked to visit some of them in order to determine the diagnosis. Eleven of these were examined by me, all of which are smallpox. The disease was brought to the county from Atlanta about November 1, and 2 deaths have occurred. Vaccination of school children is required by the school commissioners, but beyond this no action has been taken.

Very respectfully,

G. M. MAGRUDER.

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT OF INVESTIGATION OF SMALLPOX AT PATTON AND JASPER, ALA.

[Through the medical officer in command.]

BIRMINGHAM, ALA., *March 4, 1898.*

SIR: Referring to telegraphic orders of March 2, directing me to proceed to Patton and Jasper and confer with the authorities in regard to smallpox at these places and report what measures are absolutely necessary, I have the honor to inform you that I visited both of the above-named towns, and respectfully submit the following report:

Patton is a mining camp, with a population of some 500 or 600 people. During last August and September there were 9 cases of smallpox at this camp; no further cases appeared until early in February, since which time 9 cases have developed.

These cases are now in the pesthouse. The camp has been fairly well vaccinated, but disinfection has been very inefficiently performed.

In a radius of 2 or 3 miles around Patton there are three other mines, one of which is infected. Corona, the infected mine, is the largest of the four camps. I called on the surgeon at this place, and he informed me that there were about 1,000 men employed, and that these had 34 cases of smallpox since last September. At present there is only 1 case in his pesthouse. The camp had been fairly well vaccinated, and infected houses and clothing disinfected. I instructed the surgeons at these camps in regard to vaccination and disinfection. At Jasper I was informed by Judge Shepherd and county health officer, Dr. A. M. Stovall, that the county was able to take charge of these camps—could furnish vaccine and employ help, if necessary; but stated that the people at the above-mentioned mining camps seemed anxious that the Marine-Hospital Service should take charge.

Dr. Woodson, of the United States Army, who was on a visit to his father, the surgeon of the Patton mine, informed me that he had suggested to the authorities the advisability of calling on the Service.

The health officer, Dr. Stovall, impressed me as a well-informed and energetic physician. He seemed anxious to learn our methods of dealing with smallpox, and said he would take charge of the mines near Patton at once; and as he knew the owners of these mines, thought he would have no trouble in getting their cooperation and putting a stop to the spread of the disease.

There were no cases of smallpox at Jasper, and the only other infected place in Walker County, besides the Patton and Corona camps, was Horse Creek Mine, where 3 cases had been reported.

From the above facts it seems that the Service was called on for assistance at the suggestion of Dr. Woodson, who was under the impression that the Service would be willing to take charge. I am convinced that there is no necessity for Government assistance, and respectfully recommend that no action be taken in regard to smallpox at the above-mentioned places.

Respectfully, yours,

B. W. BROWN,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

RÉSUMÉ OF THE WORK OF THE SERVICE IN SUPPRESSING SMALLPOX IN ALABAMA.

BIRMINGHAM, ALA., *March 10, 1898.*

SIR: I have the honor to make the following report of the work of the Service during the past two months in its efforts to suppress the epidemic of smallpox in Talladega and Jefferson counties, Ala.

Smallpox was declared epidemic in Birmingham and Jefferson County in July, 1897, and previous to the date of my arrival, on January 4, 1898, 406 cases and 15 deaths had been reported to the county physician. Quarantine camps had been established near Birmingham and Bessemer, in which 375 and 14 cases had been treated, respectively, and a detention camp, called Camp Evans, in which suspects were detained under observation sixteen days, was located near the former city.

It is difficult to trace the origin of the epidemic. It is claimed by some that the first case came from Memphis, Tenn., during May, 1897; by others, that it was brought from Pensacola, Fla., about the same time; still others state that it had existed among the negroes for the past year or two, and was not recognized or reported by their physicians.

In my opinion, however, it is not improbable, in view of the wide dissemination of the disease throughout the United States during the past few years, that infec-

tion occurred simultaneously from several sources. At all events, it was declared epidemic here in the early part of July, 1897.

Jefferson County, in which Birmingham is situated, comprises about 1,000 square miles, and contains a population of about 110,000. Half of this population resides in Birmingham and the remaining half in mining camps and towns varying in size from 100 to 8,000 inhabitants, scattered over the county. The negroes, to whom the disease is almost exclusively confined (only 23 whites having contracted it) here as elsewhere, are the great disseminators of infection. Essentially itinerant, they travel from mining camp to mining camp, from town to town, carrying the disease with them, so that during the month of December cases were reported from 21 towns and camps in this county, and many other localities throughout the State are infected.

Vaccination is compulsory by city ordinance in most of the towns, but with the exception of Birmingham practically no attempt had been made to enforce it. Vaccine virus was furnished free by the county and about 75,000 tubes and points had been distributed previous to my arrival.

The local authorities having failed to arrest the progress of the epidemic, and claiming that all available funds (about \$30,000) had been expended, called on the Service for aid, and in accordance with your instructions an offer was made to assume general control of all matters connected with the outbreak, to place officers in charge of quarantine and detention camps, furnish vaccine virus, and organize an inspecting and vaccinating corps, the city and county to bear all other expenses. This offer was accepted January 8, and on the following morning a corps of inspectors (30 in number) commenced work in Birmingham.

Each inspector was assigned a certain territory, varying in extent from 4 to 12 blocks, according to population, and was instructed to make a house-to-house canvass, entering in a notebook the address of each house visited, the names of all inmates of each house, date of last vaccination of each individual, whether or not such vaccination was successful, and to vaccinate all persons who had not been successfully vaccinated within the last year, as evidenced by an examination of the scar in each case. Each room in every house was to be visited, especially in negro quarters, where smallpox was most prevalent, and a thorough search of the premises made for cases that were being concealed.

No certificate of vaccination was to be honored, and although this, at first glance, may appear an unreasonable and arbitrary ruling, still, when the facts are recalled that in all large towns there are usually some physicians who will give false certificates for a small fee; that there are many persons who will forge certificates; that certificates issued in good faith by reliable physicians may be given by their recipients to parties who have never been vaccinated, and, finally, that a certificate of vaccination is no evidence that such vaccination was successful, the necessity of the above measures will be easily apparent.

The inspectors were especially directed to be at all times courteous in their treatment of persons of all classes, to explain to those who objected the necessity of the measure, and report to me daily for prosecution by civil authorities the names and addresses of those who refused to be vaccinated or to permit an examination of their vaccination marks. From the nature of their work the inspectors necessarily came in contact with people of all classes, refined and rough, reasonable and unreasonable, crank and sage; still to their credit be it said that only in four instances have complaints been made of discourteous treatment, while numerous have been the compliments paid on the thorough but gentlemanly manner in which their difficult and delicate duties were performed.

The men employed as inspectors were selected from among the physicians of the city, second-course medical students, and laymen, many of whom had had previous experience in work of this character. They were given special instruc-

tions in vaccinating, and were taught the characteristics of scars made by successful vaccination. Many of them, of course, were not competent to diagnose the disease; therefore they were instructed to report at once by telephone to my office any cases of a suspicious nature with which they came in contact, and a physician was immediately sent to investigate the matter. If the case proved to be smallpox, the pest wagon was summoned, the patient at once sent to the quarantine camp, the other inmates of the house who could not show marks of recent successful vaccination were vaccinated and kept in the detention camp sixteen days, while those who had been successfully vaccinated were discharged after disinfection of persons and clothing and, as an additional precaution, were again vaccinated. Infected houses were washed down with bichloride solution (1-800) from a force pump; mattresses, pillows, and bedquilts were burned; clothing and other articles capable of conveying infection were saturated with the same solution or treated with formaldehyde. As nearly all the infected houses were negro cabins, which are very poorly constructed, with cracks and openings on all sides, gaseous disinfection was considered useless, and only in few houses of the better class were sulphur and formaldehyde employed.

The working hours of the inspectors were from 8 a. m. to 5 p. m., with an hour for lunch, and each one was required to report to the central office in the evening the amount of work done during the day; likewise inspectors in the different towns (some 15 or 20 towns) forwarded by mail on special form (Exhibit A) reports of their daily transactions. From these reports records were compiled in the office which would show at a glance both the daily work of each individual and the total amount of daily work in each town. Two supervising inspectors were appointed whose duty it was to instruct the men in their duties and inspect their work.

As the principal method of spread of the disease seemed to be through negro miners, who constantly pass from one mining camp to another, and from camps to town, and as these men usually object to vaccination, and are not within reach of city ordinance, an attempt was made to secure the cooperation of mine owners and superintendents. Meetings were accordingly held on January 9 and 10, which were attended by men whose mines and furnaces employ and support about 40,000 persons, and they agreed to assist me in every way possible. Notices were accordingly published and posted at different mines and furnaces, signed by all the firms that had entered into the agreement, stating that no person could be employed who refused to have himself and family vaccinated.

Previous to this time an attempt had been made by superintendents of some of the companies to enforce vaccination, with the result that the men would leave in such numbers as to cause serious embarrassment from lack of laborers, and the attempt was discontinued. As soon as they learned, however, from these notices that neighboring mines would not give them employment unless vaccinated, desertion almost entirely ceased, and the inspectors have met with but little opposition in their work at these points. Operations having been successfully begun in Birmingham, I visited as rapidly as possible the remaining infected points in Jefferson County, and inspectors were detailed to carry on the work at the following places in the manner indicated above: Adamsville, Bessemer, Blue Creek (including Johns, Sumter, and Adger), Brookside, Blossburg, Coalburg, Dolcita, Dolomite, East Lake, Ensley, Irondale, Ishkooda, Mary Lee, Oxmoor, Pratt City, Thomas, Woodlawn, Woodward, Warrior, New Castle, Smith Mines, Leeds, Brighton, Gloss Mines, and Browns Station.

In addition to the towns and cities of Jefferson County, the Service also assumed charge of affairs in Talladega. Fortunately, aid was asked by the mayor early in the epidemic, four weeks after the appearance of the first case, and was promptly extended. This city was inspected on January 15, and guards were

placed around all infected houses pending the building of a pesthouse, the erection of which was commenced by the county judge and completed with commendable promptness. On January 17 there were 37 cases of smallpox in the town. A corps of inspectors from the Birmingham force was sent there on the above date, and the transfer of patients to pesthouse, disinfection of houses, etc., was carried on under the personal supervision of Assistant Surgeon Hastings, and I can pay no higher tribute to the thoroughness of his methods than simply to say that on January 30, fourteen days after the commencement of the work, smallpox ceased to exist within the city limits, and not a single case has since been reported. Forty-three cases in all appeared in the city, 3 of which developed among the suspects in the detention camp. The disease here was confined to negroes and white employees of cotton factories, and was attended by no mortality.

The amount of work done by the inspecting corps will be seen from the following table:

Place.	Houses inspected.	Persons inspected.	Persons vaccinated.	Cases of smallpox found.		Houses disinfected.
				White.	Colored.	
Birmingham	22,584	89,612	18,505	7	38	21
Bessemer	10,287	32,749	7,936	3	151	160
Other points in Jefferson County	6,629	23,448	10,299	4	68	29
Talladega	1,713	6,966	2,185	25	18	13
Total	41,213	152,775	38,925	39	275	223

The above table simply shows the work done by the corps. It does not give the actual number of houses or persons inspected, for in some towns second and third inspections were partially made, and, of course, many houses and persons were inspected and counted twice and three times.

The total number of cases treated in the three quarantine camps (at Birmingham, Bessemer, and Talladega) under the control of the Service has been 353, with a mortality of 2.55 per cent. If the 406 cases with 15 deaths, which occurred prior to the commencement of Service work, be included in the above, the total number of cases will amount to 759, with 3.16 per cent mortality.

The following tables compiled from the records of cases treated at quarantine camp near Birmingham are self-explanatory:

PATIENTS TREATED AT BIRMINGHAM QUARANTINE HOSPITAL, UNITED STATES
MARINE-HOSPITAL SERVICE.

Colored	219
White	6
Total	225
Male	157
Female	68

AGE.

Under 1 year	2
1 to 10 years	21
10 to 20 years	40
20 to 30 years	113
30 to 40 years	32
40 to 50 years	13
50 to 60 years	3
60 to 70 years	1

STAGE OF DISEASE AT TIME OF ADMISSION.

Papular	92
Vesicular	44
Pustular	26
Desquamative	58

RECORD OF PREVIOUS VACCINATION.

Number never vaccinated	106
Unsuccessfully vaccinated	101
Good scars	2
Doubtful scars	5
Recent vaccination, in course of development	7

Mortality table.

No.	Age.	Sex.	Type of disease.	Vaccination.
1	1 month	Female	Discrete	Never vaccinated.
2	23 years	Male	do	Do.
3	21 years	Female	Malignant	Doubtful scar.
4	50 years	Male	Confluent	Never vaccinated.
5	37 years	do	do	Unsuccessful.

TYPE OF DISEASE.

Varioloid	8
Discrete variola	142
Confluent variola	74
Malignant variola	1

As only 1 case has developed in Jefferson County (including Birmingham and Bessemer) within the past six days, the epidemic may be said to be at an end for the present.

As stated, however, in my former reports, cases will probably continue to appear for some time to come. Smallpox having existed here in epidemic form since July, 1897, it has been impossible to discover and disinfect all infected points. Cases also from adjacent counties and States are constantly finding their way into this county and city, bringing infection with them, and as quite a number of persons have doubtless evaded the inspectors and avoided vaccination, and as, owing to the shifting nature of the population, large numbers of the unvaccinated persons are daily coming in, material will probably be furnished to keep the disease alive for some time. Moreover, in the country, and in some of the towns and mining camps where vaccination is optional, as soon as new cases ceased to appear, the inspectors met with such opposition that I was forced to withdraw them, after having accomplished but little in the way of vaccination.

I have urged the mine owners to have all new laborers vaccinated before employment, by their mine physicians, and although this precaution is taken by some, it is neglected by the majority, who believe that since the epidemic is over no new cases will appear.

In addition to work outlined above, the following infected points were visited and inspected, reports on the condition existing at each were forwarded to you, and the local authorities advised as to the method of suppressing the epidemic: Pinckard, Newton, Opelika, Anniston, Maplesville, railroad camp near Centerville, Haynesville, Jasper, and Patton; and Cartersville and Stilesboro in the State of Georgia.

The methods employed in the establishment and administration of the various camps have too often been described to require notice in this report. The only departure which possibly may be worthy of note is the plan of surrounding the

camp with a high barbed-wire fence; 30 feet within this fence a single wire was drawn to mark the dead line, beyond which no patient was allowed to pass, and in this space between dead line and fence the guards were stationed. At night the entire picket line was lighted by large gasoline torches, thereby enabling a small number of guards to effectually prevent the escape of convalescents.

To the mayor of Birmingham, the commissioners of Jefferson County, and to the chairman of sanitary committee of Talladega, I wish to express my appreciation of the prompt and efficient manner in which they have aided and supported me in every way possible, and to the following officers, who served with me, thanks are due for their valuable assistance: P. A. Surg. B. W. Brown (temporarily on duty), Asst. Surg. Hill Hastings, Acting Asst. Surgs. W. D. Farrow and Ira W. Porter, and Hosp. Stewards F. R. Hanrath and F. H. Peck.

Respectfully, yours,

G. M. MAGRUDER,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT ON WORK OF THE SERVICE IN SUPPRESSING THE EPIDEMIC OF SMALLPOX AT MIDDLESBORO, KY.

On March 10, 1898, I received a request from the Congressional representatives from Tennessee and Kentucky for aid in suppressing the outbreak of smallpox at and in the vicinity of Middlesboro, Ky. As the State board of health had been in control of sanitary affairs up to this date, and as at a later date there was some dissatisfaction expressed by an officer of the State board in regard to the Service attitude at Middlesboro, I publish herewith the entire correspondence on the subject:

HOUSE OF REPRESENTATIVES,

Washington, D. C., March 10, 1898.

SIR: Herewith I send you a telegram just received by me from John G. Fitzpatrick, esq., mayor of Middlesboro, Bell County, Ky., as to the smallpox situation at said place. The situation is a very grave one. All southeast Kentucky, East Tennessee, and southwest Virginia are involved, or liable to be, and neither the municipal, county, or State authorities are able to control the epidemic. I ask your immediate consideration and such assistance as you can extend. Middlesboro, Ky., seems to be the center of the district in which the disease is now raging.

Very respectfully,

DAVID G. COLSON, M. C.

SURGEON-GENERAL MARINE HOSPITAL,

Washington, D. C.

I fully concur in the above. The smallpox is spreading in my district. I ask for immediate action.

W. P. BROWNLOW, M. C.,

First Tennessee.

[Inclosure.]

MIDDLESBORO, KY., *March 10, 1898.*

This telegram received from J. N. McCormick, secretary State board of health: "Unless city or county can arrange, will be forced to release you and local board from duty, stop all trains, and advise adjoining counties to protect themselves." County refuses aid; city has no funds. Can Federal aid be had? Ascertain and answer.

J. G. FITZPATRICK,

Mayor.

Hon. D. G. COLSON, M. C.

In compliance with this request, P. A. Surg. C. P. Wertenbaker was ordered to proceed at once to Middlesboro, Ky., and report upon the situation at that place, and the following telegram was sent to the secretary of the State board of health of Kentucky:

WASHINGTON, D. C., *March 11, 1898.*

Upon request of Kentucky and Tennessee Representatives, have ordered P. A. Surg. C. P. Wertenbaker to report on smallpox situation at Middlesboro, in its interstate aspect. Wire if Bureau can aid you.

WYMAN,
Surgeon-General.

REPORT OF PASSED ASSISTANT SURGEON WERTENBAKER.

MIDDLESBORO, KY., *March 14, 1898.*

Forty-nine cases variola here in pesthouse and 23 suspects; 400 suspects quarantined at their homes. Population, 4,200. One hundred and sixty-nine cases since February 28. Two new cases yesterday. Disease declared epidemic in city March 4. City quarantined; none allowed in or out. Dr. A. T. McCormack, chief State sanitary inspector, with four assistants in control, and states that State board is able to control epidemic, expecting to force county to furnish funds. Citizens' committee, headed by mayor, protest that city is without funds, and the county refuses to make appropriation. In meantime patients are without food. Citizens' committee have wired board of health and governor asking that Government be requested to render assistance, which chief inspector says board will not do. Under circumstances do not see that Service can do anything. I will leave to-morrow morning, rejoining Wilmington, unless otherwise ordered.

WERTENBAKER.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

WASHINGTON, D. C., *March 14, 1898.*

Are measures taken sufficient to protect Tennessee and Virginia? Wish report on prevalence of disease in these two States in that general neighborhood. Answer and await instructions.

WYMAN,
Surgeon-General.

P. A. Surg. C. P. WERTENBAKER,
United States Marine-Hospital Service.

MIDDLESBORO, KY., *March 14, 1898.*

The following telegram has been received by the citizens' committee: "J. R. Sampson and others: Your telegram received. After consultation with the governor of Kentucky, I authorize Dr. Wertenbaker to take charge, if the Federal Government will defray expenses. There is no money in our treasury and no law to appropriate any for this purpose. Signed, J. M. Matthews, president State board health."

A telegram has just been received by the chief inspector from McCormack, secretary of State board, recalling all State board officers. This will leave the situation absolutely unprotected. If authority in Matthews's telegram is sufficient, I recommend that I be authorized to take charge to-night, and request that camp equipage train be ordered to report to me at once. Please authorize necessary immediate expenditures for provisions, guards, etc. In Tennessee there are

59 cases at 19 points. Albright, secretary Tennessee board of health, authorizes statement that all are under control. Have heard of no cases in Virginia in this neighborhood.

WERTENBAKER.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

WASHINGTON, D. C., *March 14, 1898.*

Notify at once chief inspector, also Secretary McCormack, you have not been authorized to take control, and State officers should not be recalled. The Government's interest is in protecting other States, and nowhere is the whole expense borne by the Government. Every municipality should have enough pride in itself to suppress this ordinary contagious disease. In Alabama, where there were no municipal funds, the citizens raised funds. Will wire to-morrow. Keep me posted.

WYMAN, *Surgeon-General.*

P. A. Surg. C. P. WERTENBAKER, *M. H. S.*

MIDDLESBORO, KY., *March 14, 1898.*

Wired McCormack on receipt of your message, as directed. Chief inspector and assistants left within an hour after receipt of orders, which directed them to leave at once, the message being doubtless sent by McCormack on receipt of copy of Matthews's message to citizens' committee. Local board of health in charge. County judge decided to-night that county had no funds and no law for appropriating funds for such purposes. Will keep you informed.

WERTENBAKER.

SURGEON-GENERAL MARINE HOSPITAL SERVICE.

FRANKFORT, Ky., *March 14, 1898.*

State board of health withdrawn from Middlesboro County; refuses to appropriate money; to-morrow last day of session, and doubtless no appropriation can be gotten through. Fitzpatrick telegraphs 70 cases; 400 suspects; nothing with which to feed them. Act of Congress not in library, and I do not know what the law allows. Am told Surgeon-General of the United States may be appealed to to take charge immediately. If such can be done, request him in my name to take charge.

W. O. BRADLEY,
Governor of Kentucky.

Hon. D. G. COLSON, M. C.,
Washington, D. C.

FRANKFORT, KY., *March 15, 1898.*

I asked the legislature for appropriation, but it adjourned without action.

W. O. BRADLEY,
Governor.

Hon. D. G. COLSON, M. C.,
Washington, D. C.

MIDDLESBORO, KY., *March 15, 1898.*

Middlesboro has 3,500 people dependent for support on wages of working people.

* * * * *

People poor; business suspended; request your immediate assistance.

J. G. FITZPATRICK,
Mayor.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

WASHINGTON, D. C., *March 16, 1898.*

Request from governor through Representative Colson for Service to take charge. Assume that this is in accordance with board's wishes; if not, advise. Will furnish medical officers, attendants, guards, inspectors, and attend to vaccination and disinfection. Will expect local authorities to care for poor not sick and furnish all subsistence so far as possible, funds having been raised, according to mayor.

WYMAN, *Surgeon-General.*

J. M. MATTHEWS,

President State Board of Health, Louisville, Ky.

BOWLING GREEN DEPOT, KY.,

March 16, 1898.

Board asks you to aid and cooperate under our regulations. We accept heartily if this is your proposition.

McCORMACK,

Secretary State Board of Health.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

WASHINGTON, D. C., *March 17, 1898.*

Will render the aid mentioned in telegram to president of board yesterday, as aid and cooperation under your regulations. All expenditures, however, must be supervised and accounted for by our own officer, who has been directed to confer with your representative and work in harmony.

WYMAN, *Surgeon-General.*

SECRETARY STATE BOARD OF HEALTH.

Bowling Green, Ky.

As stated above, on the 10th of March, 1898, P. A. Surg. C. P. Wertenbaker was ordered to proceed from Wilmington, N. C., to Middlesboro, Ky., to investigate and report on the situation. The following is his report:

SMALLPOX AT MIDDLESBORO, KY.

MIDDLESBORO, KY., *March 14, 1898.*

SIR: I have the honor to report that, in obedience to telegraphic orders, Surgeon-General's Office, March 10, 1898, I arrived here last evening at 8 o'clock. This morning, accompanied by Dr. A. T. McCormack, chief State sanitary inspector, who, with four assistants, is in control here, I visited the pesthouse and found 49 cases of variola and 23 suspects. There are also 400 suspects quarantined at their homes. The first case occurred in October, 1897, and was imported from Birmingham, Ala. The State board of health took charge of the epidemic on February 28, 1898, declaring the disease epidemic, and since that time there have been 169 cases and 2 deaths to this date, 34 of the cases being white and 135 negroes, one of the latter being a child one day old, the eruption appearing at the same time on mother and child. The population numbers about 4,200, and consists chiefly of the employees of the furnaces and a tannery, and miners, who live in the town and work in the adjoining mines. Nearly, if not quite, half the population are negroes. The town has been absolutely quarantined since February 28, no one being allowed either to enter or leave it. Sixteen guards, one day and one

night, guard each of the eight roads leading to the town, and no tickets are allowed to be sold either to or from the town, and practically there is no travel. Since the board of health took charge, 1,960 people have been vaccinated, and forcible vaccination is still progressing. The occasion for the request for an officer of the Marine-Hospital Service was as follows: Middlesboro was a "boom town," started some ten years ago, and several million dollars were invested here in various enterprises. In two or three years the "boom" collapsed and left the town stranded with a heavy debt. When this epidemic came it found the town without a dollar in the treasury. The place is practically owned by two or three companies, and everybody works on a salary. These companies paid up their taxes in advance, and all having been expended, there were no other funds for the city to draw on.

The county, which is also heavily in debt, has been haggling with the city in regard to an appropriation, but none has been made. The city scrip is worthless, and the grocer who has been furnishing the supplies refuses longer to accept it. The physicians and guards are practically getting no pay. Under these circumstances the State board of health threatened to withdraw all guards and physicians, and quarantine the entire county, unless the county provided funds to care for the epidemic. In the presence of this threat the mayor requested that an officer of the Service be sent to investigate, trusting that the Government would come to their aid financially, if not otherwise. I am informed by Dr. McCormack, chief sanitary inspector, who is a son of the secretary of the State board, and who is acting for him here, that the disease is under control and that the State board is entirely able to care for it, it being the determination of the board to force the county to provide funds. To-day the patients are without food. A committee of citizens met and discussed the matter, and have wired the situation to the governor and the State board, asking them to request the assistance of the Government. Chief Inspector McCormack informs me that the board will not make such a request, claiming that it is able to handle the situation itself. Under these circumstances I do not see that the Service can do anything further in the matter. There are a few cases of variola at Jellico, Ky., but Dr. McCormack informs me that they are under control and thoroughly isolated. Numerous little towns and villages within a radius of 20 miles have instituted "shotgun" quarantines, and will allow no one to enter or leave them, though they have no smallpox in them. Among these places may be mentioned Pineville, Ky., Cumberland Gap, Morristown, Greeneville, Limestone, Jonesboro, and Tazewell, all in Tennessee. Some of these places will not allow any one to get off the train. While en route to this place I had to delay several hours in Knoxville, and called on the city physician and met several of the prominent business men. I am informed that in Knoxville there have been 16 cases of variola since December 14, 1897, and 30 suspects; that there are now 5 cases in the pest boat, which is anchored out on the river above the city. I am informed that the disease is under control in Knoxville and no further danger is feared except from reinfection.

Respectfully, yours,

C. P. WERTENBAKER.

Passed Assistant Surgeon, U. S. M. H. S., on Special Duty.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

At the request of the president and secretary of the State board of health of Kentucky, of the governor of the State, and of the member of Congress from the district including Middlesboro, for national aid in suppressing the epidemic of smallpox prevailing in Middlesboro and vicinity, P. A. Surg. C. P. Wertenbaker, who had been ordered on March 10 to investigate and report on the situation, was directed

on March 17 to confer and cooperate with the State authorities by furnishing inspection, vaccination, and disinfection service.

MIDDLESBORO, KY., *March 24, 1898.*

SIR: I have the honor to make the following report on the operations of the Service at this place:

Upon receipt of your telegram on the afternoon of March 17, 1898, directing me to assume control of the operations of the Service at this point, I held a consultation with the representative here of the State board of health (Dr. Robertson) and outlined a plan of action for the suppression of the epidemic of smallpox here. I employed 5 inspectors and started them at work making a thorough inspection of the city, vaccinating all persons that had not been successfully vaccinated. I also employed 25 guards. Not being able to secure the camp train, it became necessary to look around for some house capable of being used as a hospital. I was fortunate in securing one that was originally built as a boarding house, containing ten rooms upstairs and five large rooms on the first floor. It was occupied at the time as a boarding place, and I had to pay the proprietor \$50 to move out; but as it was the only available place to be found it was considered best to do this. The house is located in the outskirts of the city, about a mile from the center, is isolated and well adapted for the purpose. It had to be completely fitted out, as it contained, after the boarding-house keeper moved out, only a cooking stove and 12 chairs, which I bought of the keeper. By hard labor we got the house fitted up, and moved into it 91 persons from the former pesthouse, which was located in a thickly settled part of the city and adjoined the detention camp, and there were no adequate means of keeping the patients and suspects apart. The Service was then organized under six divisions, as follows: Headquarters, inspectors, guards, disinfecting division, suspect camp, and smallpox hospital.

SMALLPOX HOSPITAL.

The smallpox hospital corps consists of Dr. W. C. Duke in charge, nurses, cooks, attendants, etc. An ambulance has been secured, and is kept near the hospital, and is sent in whenever needed for a patient.

SUSPECT CAMP.

The suspect camp consists of a row of wooden houses, 12 in number, adjoining a row of 4 houses that were formerly used as a smallpox hospital. This camp is in charge of Dr. W. N. Shoemaker, and has the usual corps of attendants. At both the smallpox hospital and suspect camp the physicians in charge remain in each, respectively, and the physician of the smallpox hospital is quarantined and not allowed to leave the place. Both the camp and hospital are supplied with tents furnished by the State board of health, and are used as bathing and disinfecting tents. Patients discharged from the hospital are given a bath, followed by a bichloride of mercury bath (1-2000), and then a bath in fresh water. The clothes are washed in a solution of bichloride of mercury (1-800) and dried. The same precautions are taken with suspects admitted and discharged from the suspect camp. All suspects are vaccinated on admission. Suspects are detained sixteen days.

INSPECTOR'S DIVISION.

Under the direction of Chief Inspector Dr. Samuel Blair, the city has been divided into 5 districts, and an inspector assigned to each. They report at headquarters at 9 a. m. and between 5 and 6 p. m. They make a house-to-house inspection, examining all persons, vaccinating all who have not been protected, and in the event of the refusal of anyone to be vaccinated, the name of each person so refusing is sent in to headquarters, where they are turned over to the city author-

ities where the option is given them of being vaccinated or being sent to jail, and in the latter event they are vaccinated as soon as they enter, under a law requiring all inmates of jails to be vaccinated. Any case of smallpox, or suspicious case of disease, is at once reported by telephone to headquarters, and the chief inspector is directed to visit and report on the case. Should the case prove to be smallpox, the ambulance is sent at once to remove it to the hospital. Another ambulance, connected with the suspect camp, is kept to bring suspects and their bedclothing to the camp, this clothing being disinfected before being used.

GUARDS.

The guard consists of a chief and assistant chief and 25 privates, guarding the smallpox hospital, the suspect camp, the depot, and the four principal roads leading into the city, for at the present time the city is in quarantine, and no one is allowed to go in or out except upon a permit signed by myself and Dr. Robertson. The chiefs of guard are on duty for twelve hours each daily; the guards at the camp and hospital are relieved every eight hours, while those at the depot have a twelve-hour tour of duty. Those guarding the roads are on from 6 a. m. to 10 p. m. The chiefs are required to accompany each relief and put the men on duty, and also to inspect the post of each guard at least once during his tour of duty. As the guards are much scattered, the chief is furnished a horse. The guards are armed with Springfield rifles borrowed from the local military company, and the presence of a guard with a rifle on his shoulder is very effective in keeping order.

DISINFECTING DIVISION.

This division is under the charge of Acting Assistant Surgeon Porter. Two autoclaves, with carboy of formalin, have been received from New Orleans for use in this division. Sulphur disinfecting outfit, consisting of pots, tubs, etc., have been purchased. Bichloride solution in barrels, with force pump and hose, has also been secured, and this division is at work. Two wagons are required to transport the outfits from house to house, and the work will be pressed as rapidly as possible. A map of the city, with each infected house marked on it with red ink, has been made, and as each new case appears the house is marked on the map, and is disinfected as soon as possible. There is much work for this division to do, as there are many infected houses. Those houses that can not be disinfected will be reported to the local authorities with the request that they be burned.

HEADQUARTERS.

I have secured comfortable offices, centrally located, for administrative work. I have had a telephone put in, which enables us to communicate with the smallpox hospital, the inspectors, and other parts of the city. The work now being systematized, and the raw material being gradually worked into shape, we are moving along easily and effectively. The disease has been so widespread, and the methods used so ineffectual, that it is hard to predict when the epidemic will be under control. Confidence has been restored among the people, who are now looking forward hopefully to an early termination of their trouble.

Respectfully, yours,

C. P. WERTENBAKER.

Passed Assistant Surgeon, U. S. M. H. S., Commanding
SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

MIDDLESBORO, KY., *March 28, 1898.*

SIR: I have the honor to report that the situation here is rapidly improving, and that the epidemic is under control. Only two cases have developed since

March 22, and for the past six days no case has developed. Isolation of cases and suspects and disinfection of houses and clothing have been prompt.

The disinfecting division is now at work disinfecting houses that are suspicious, houses in which cases of smallpox had occurred previous to the arrival of the Service, and which have been unoccupied since.

The inspection service has been thorough, and for the past five days has been directed particularly to the infected district, which is occupied chiefly by negroes, but no case of smallpox has been found.

There are 32 cases in the smallpox hospital this morning, a good many of which will be discharged within the next few days. There are 23 suspects in the detention camp this morning; a majority of them will have covered their period of detention this week.

I think that the quarantine of the city, which was put on by the State board of health on February 28, 1898, can be raised by Monday, April 4, 1898, and all guards, except those for the smallpox hospital and detention camp, be discharged. * * *

Respectfully, yours,

C. P. WERTENBAKER,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

MIDDLESBORO, KY., *April 7, 1898.*

SIR: I have the honor to make the following report on the smallpox situation in this city:

In the smallpox hospital there remain 19 cases; in the detention camp, 14. Since the last report (March 28, ultimo) 5 new cases of smallpox have developed, 2 of which were in the detention camp. The last case occurred yesterday.

It was thought best to continue the quarantine of the city until another thorough house-to-house inspection could be made, and until the work of disinfection of all known infected houses could be completed. The 300 tubes of virus telegraphed for upon my arrival April 4 came yesterday, and another inspection of the city was begun. This will be finished this week, as will also the work of disinfection.

In my opinion, quarantine may be safely raised on Monday, April 11, and I have communicated with the State board of health, through its representative here, to that effect. By that time the detention camp can be abandoned, the quarantine guards dismissed, and our force reduced to those necessary for the care of the three or four patients remaining in the smallpox hospital. Unless other cases develop these few can be transferred to the county pesthouse, if orders to that effect are received from the Bureau, and the Service affairs here can be brought to a close on the 12th or 13th instant.

* * * * *

Very respectfully,

HILL HASTINGS,

Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

MIDDLESBORO, KY., *April 15, 1898.*

SIR: I have the honor to respectfully submit the following report of the work of the Service in suppressing the epidemic of smallpox in this city:

A brief résumé of the course of the epidemic before the Service took charge may not be inappropriate. The first case of smallpox in this city developed in the latter part of November. No accurate knowledge can be obtained as to the date of occurrence or whence it came. It is thought to have come from Birmingham, Ala. From this the disease spread among the negroes and lower class of

white people. Owing to its mildness and the doubts that existed as to its being smallpox, no active steps to prevent the spread of the disease were taken at first. Many cases would recover without medical attention. After smallpox had become epidemic the city and county health officials undertook to stamp out the disease. As there was no pesthouse established, the cases, with those who had been exposed, were gathered together in a row of vacant houses, vaccination of the inhabitants, estimated at 3,000, was begun, and quarantine of the city was declared by the State board of health. When the resources of the city and county were exhausted, the State board of health was applied to for relief. Vaccination inspectors were sent and the vaccination of the inhabitants was thoroughly done as long as the inspectors remained. But the State authorities refused to bear the expense of the epidemic. An appeal was then made to the Surgeon-General of the Marine-Hospital Service. P. A. Surg. C. P. Wertenbaker was directed by telegraphic orders, dated March 10, to proceed to Middlesboro and to report on the situation. On the 17th instant, at the request of the State board of health, Dr. Wertenbaker was directed by this Bureau to cooperate with the board of health through its representative, Dr. L. L. Robertson, in stamping out the smallpox, and took charge of Government measures. There were then 89 cases of smallpox and 56 suspects. The number of cases that had occurred previous to this was estimated at 100 to 150; only 2 fatal cases had occurred. As rapidly as possible isolation of the suspects was accomplished. The smallpox cases were transferred to a large building that was secured for a hospital, and Dr. C. W. Duke, of Memphis, Tenn., who had been trained in Service methods in previous epidemic work, was made resident physician. A suspect camp was at once established, with Dr. W. N. Shoemaker, of Birmingham, Ala. (who was also familiar with Service methods), as resident physician. A disinfecting corps was organized, and the work of disinfection of all known infected houses was begun under the supervision of Acting Asst. Surg. Ira W. Porter. A thorough force of guards was organized to carry out the quarantine proclamation of the State board of health and to guard the smallpox hospital and suspect camp. A house-to-house inspection of the city was made and repeated until the epidemic was at an end. To facilitate the transaction of business with neighboring States, quarantine passes were given to those who were successfully vaccinated and were free of infection.

After the Service took control 7 cases of smallpox in all were found (one of these occurred in the suspect camp) and 14 suspects were placed in camp. The last case developed on April 6. Previous to the separation in separate camps of suspects from smallpox cases 7 suspects were taken with smallpox. The infected houses, 97 in number, were disinfected by 1-800 solution of bichloride of mercury, and all clothing and household goods were soaked in solution of the same strength. Mattresses, pillows, and thick quilts were burned. Except in a few instances, it was impossible to disinfect with sulphur or formaldehyd, as the infected houses were not close enough for gaseous disinfection. As directed by telegraphic orders of the 2d instant, I relieved Passed Assistant Surgeon Wertenbaker on April 5. The methods already put in operation were continued. A final house-to-house inspection was made, of which the result is shown by Exhibit A. The detention camp was abolished on April 9, after discharge of the last suspect. The disinfection of the remaining infected houses was finished on April 11, and the quarantine was raised and guards dismissed on the same day. The schools, which had been closed for two months, were allowed to begin, after inspection of the children and revaccination when necessary. On April 14 the number of cases of smallpox had been reduced to 2. These were transferred to the county pesthouse, and on the following day, by order of the Bureau, the camp was broken up and the Service affairs brought to an end.

The following tables are taken from the records of the smallpox hospital. Exhibit A shows the number of successful vaccinations in the city.

EXHIBIT A.

Final house-to-house inspection.

Number of houses.....	475
Persons inspected.....	a 2,817
Successfully vaccinated.....	2,552
Primary and revaccination.....	265

Patients treated at smallpox hospital.

Colored.....	76
White.....	27
Total.....	103
Male.....	64
Female.....	39

Age.

Under 1 year.....	7
Under 10 years.....	15
10 to 20 years.....	19
20 to 30 years.....	43
30 to 40 years.....	13
40 to 50 years.....	4
50 to 60 years.....	2
Number of deaths.....	*0

Development of smallpox cases.

Week ending—	Cases.
March 3.....	31
March 10.....	31
March 17.....	18
March 24.....	11
March 31.....	2
April 7.....	3

Valuable assistance was rendered by Acting Asst. Surg. Ira W. Porter, Drs. C. W. Duke, W. N. Shoemaker, Byron Dozier, J. W. Francisco, and J. G. Moss, and by Stewards F. R. Hanrath and F. H. Peck. The Service is indebted to Dr. L. L. Robertson, of Middlesboro, the representative of the State board of health, for his hearty cooperation and assistance. To the mayor of Middlesboro, the city and county officials, and to the people of the city the officers of the Service, whose pleasure it was to serve them, are greatly indebted for the uniform courtesy and active cooperation extended throughout the epidemic.

Very respectfully,

HILL HASTINGS.

Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

GOVERNMENT AID AT FAIR OAKS, ARK.

The only other locality where financial aid was rendered to assist in suppressing the spread of smallpox was at Fair Oaks, Ark.

a This number is very close to the actual population during the epidemic.

Information having been received that there were cases of smallpox near that place, and that no measures to prevent the spread of the disease were being enforced, the medical officer on duty at Memphis, Tenn., was ordered to proceed from there to Fair Oaks, Ark., and report on the situation, vaccinating as many of the residents of that section as possible.

The following is his telegraphic report:

[Telegram.]

FAIR OAKS, ARK., *March 1, 1898.*

Five cases, 1 convalescent. There are not more than 50 people in this settlement; some few have been exposed. First case from Mexico, February 7. All the cases are in 1 family, in 1 house, 1 mile from settlement; they are without medical attention. Recommend employment of physician at reasonable rate to care for sick. Government furnishing disinfection from Memphis. No drug store nearer than 14 miles, at Wynne, where the convalescent went yesterday and returned. I will vaccinate everyone permitting it, to-morrow. Would also recommend weekly inspection of situation by medical officer at Memphis, to whom the physician should report. Wire instructions.

STEWART,

Passed Assistant Surgeon. U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

The above recommendations were approved by me on the same day, and there was no spread of the disease.

INVESTIGATION OF REPORTS OF SMALLPOX.

In the following investigations of smallpox, the aid rendered by the Service was limited to establishing the diagnosis and existence of the disease in the various localities, and in aid—of a purely advisory character—in suppressing the spread of the infection:

INVESTIGATION OF SMALLPOX AT CHARLOTTE, N. C.

WILMINGTON, N. C., *February 14, 1898.*

SIR: I have the honor to supplement my telegram from Charlotte, N. C., by the following report: In obedience to your telegraphic instructions of the 9th instant, I proceeded by first train to Charlotte, N. C., arriving at 10.30 p. m., February 10. I was met by the acting mayor and city and county physicians. I learned that the situation was as follows: A case, diagnosed as smallpox by the authorities, occurred January 22 in the person of William Jackson (colored), railroad hand, recently returned from Greenville, S. C., where it is supposed he contracted the disease. Jackson died on January 27. The case and all exposed persons were isolated, the latter being all vaccinated. One week after the death of William Jackson his son, Oscar Jackson, then in quarantine, developed varioloid; about the same time a girl, Sally Wagoner, developed varioloid in a different part of the city, for which no infection could be traced. This case, and all exposed persons, were removed to the pesthouse. An ordinance of compulsory vaccination was passed by the board of aldermen. The execution of this ordinance met with much opposition in some quarters, especially among the factory and mill hands, due in part to the widespread rumor that the cases were not smallpox, but more largely

to the fact that many persons who had been vaccinated had very sore and inflamed arms, and that business was being interfered with on that account. The city authorities wished the matter settled by an officer of the Marine-Hospital Service, feeling that his diagnosis would not be questioned, and would demonstrate the necessity for the measures they had inaugurated. On the morning of the 11th instant, accompanied by the city and county physicians, I visited the pesthouse and examined the cases, finding 3 cases of varioloid, 2 of which were recovering, and the other in the third day of eruption; 1 case of variola in fifth day of eruption. * * * The city authorities seemed to be thoroughly satisfied, and treated me with great courtesy. I advised the establishment of a suspect hospital and detention camp in addition to the present pesthouse, and the suggestion will be adopted. The health authorities are capable and energetic, and are making a thorough canvass of the city, vaccinating all unprotected persons. I am informed that more than half the inhabitants have been vaccinated, and the work was still in progress.

Respectfully, yours,

C. P. WERTENBAKER,
Passed Assistant Surgeon, U. S. M. H. S., in Command.
 SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

INVESTIGATION AND ADVISORY AID AT LITTLE ROCK, ARK.

LITTLE ROCK, ARK., *April 21, 1898.*

Am requested to wire following to you: "Resolved, That the president of this board is hereby authorized and requested to apply to the United States Marine-Hospital Service for such assistance as the Government may be willing to lend toward the suppression of smallpox now existing at Little Rock and vicinity. Signed: J. A. Woodson, president; F. J. Ginocchio, secretary, Little Rock board of health. Approved, Daniel W. Jones, governor of Arkansas." Thirty cases in pesthouse, 8 in city, 3 in country to-day.

GIBSON,

Acting Assistant Surgeon, U. S. M. H. S.
 SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

WASHINGTON, D. C., *April 22, 1898.*

Acting Assistant Surgeon GIBSON, *Little Rock, Ark.:*

Government can not give financial assistance, but if desired will send officer thoroughly experienced in suppressing the disease to advise and confer with board. Please convey this message to board.

WYMAN,

Supervising Surgeon-General, U. S. M. H. S.

LITTLE ROCK, ARK., *April 22, 1898.*

Resolution of board of health intended as request for Service control of outbreak. Board requests officer to be sent anyway.

GIBSON,

Acting Assistant Surgeon, U. S. M. H. S.
 SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

On receiving the above telegram, the following orders were at once telegraphed to P. A. Surg. G. M. Magruder, at Memphis, Tenn.:

WASHINGTON, D. C., *April 23, 1898.*

Have request from board health and governor Arkansas for Service assistance suppression smallpox Little Rock and vicinity. Sent reply. Government would not give financial aid, but would send experienced officer to advise with board, and board replies, requesting officer. Nominate acting assistant, and proceed to Little Rock soon as practicable. Consult with Acting Assistant Gibson, and Dr. Woodson, president board. As soon as services as advisor are completed, return to station.

WYMAN, *Surgeon-General.*

The following is his report:

MEMPHIS, TENN., *April 28, 1898.*

SIR: I have the honor to report my return to this station on yesterday, after having visited Little Rock, Ark., and conferred with the mayor and health authorities of that city in regard to the epidemic of smallpox now prevailing there.

The outbreak is directly traceable to a negro woman, convalescent from the disease, who came from Birmingham, Ala., during the first week in January. Her husband next contracted it, and then in a short time cases commenced to appear in many different localities. Fifty-nine cases have been reported to date, 4 of which occurred in a family 6 miles from town. None but negroes have so far been attacked, and the disease, in the mildness of its type, resembles that now prevalent in many other localities in the South, no death having occurred.

A pesthouse has been established 4 miles from town, in which 39 patients were confined at the time of my arrival. Vaccination is made compulsory by city ordinance, a corps of 6 physicians has been appointed to make house-to-house inspections to enforce this necessary measure, and about 5,500 persons have been vaccinated. Infected bedding is burned, and houses are disinfected with sulphur dioxide and bichloride of mercury solution (1:1000). The plan which is being pursued is a good one, and its success or failure in eradicating the disease will depend solely on the thoroughness with which it is carried out.

Respectfully, yours,

G. M. MAGRUDER,

Passed Assistant Surgeon, U. S. M. H. S., in Command.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

INVESTIGATION AND ADVISORY AID AT COLUMBIA AND SUMTER, S. C.

At the request of the local board of health of Columbia, S. C., for aid in controlling the epidemic of smallpox in that city, the following letter of instructions was sent to P. A. Surg. C. P. Wertenbaker at Wilmington, N. C.:

WASHINGTON, D. C., *April 23, 1898.*

SIR: I inclose herewith a copy of a letter which was brought to the Bureau by Senator Tillman, and acting upon it a telegram was sent to the secretary of the State board of health of South Carolina to indorse the request of the local board. A reply has been received to-day stating that the State board of health had no objections to sending expert.

It will be observed that the request is for a competent officer to advise and act

with the board in stamping out the disease. It is not the purpose of the Bureau to incur any expenditures in stamping out the disease at Columbia, S. C., the principle being held by the Secretary that smallpox is a disease which should be stamped out by the local authorities, and only under very extraordinary circumstances will the Government undertake to do more, and then only in the interest of other States. The Bureau has been obliged to refuse financial aid to a number of localities and will continue to do so. The Department is willing, however, that a medical officer who has had special experience in the management of this disease should give the benefit of his experience to local officers, and this is the purpose for which you are sent to Columbia. You are not to take charge; you are simply to advise and cooperate with the local board, giving the latter the benefit of your experience in these matters.

With this view, you are hereby ordered to proceed to Columbia and to confer with Dr. J. W. Babcock, and as soon as your services of the above character are completed you will return to your station. You are directed to nominate an acting assistant surgeon for duty at Wilmington during your temporary absence.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General U. S. M. H. S.

On the return of P. A. Surg. C. P. Wertenbaker to Wilmington, N. C., he made the following report on the situation at these places with regard to smallpox:

WILMINGTON, N. C., May 2, 1898.

SIR: I have the honor to report that in obedience to orders, Surgeon-General's Office, April 23, 1898, I proceeded to Columbia, S. C., arriving at 10.30 p. m., April 27. I reported to the board of health of the city, and made an investigation of the situation. I found much the same condition of affairs here as in so many other places. The disease had not been recognized as smallpox, or, at least, there had been such a difference of opinion in regard to it that the board of health had found great difficulty in inducing the people to take necessary precautions or to get sufficient funds to properly handle the disease. At the time of my arrival there were between 75 and 100 cases of smallpox in the city. Of this number, 53 were in a small building, some 2 miles distant from the city, under the care of a physician who was quarantined with the cases. There were numerous other cases scattered throughout the city, with whom persons were constantly coming in contact. These cases were directed to remain at home, but there were no guards over them, and other members of the family went in and out as it pleased them. Vaccination was proceeding in rather a desultory fashion, and probably a third of the people had been more or less successfully vaccinated. There was a good deal of opposition to the vaccination ordinance, owing to the fact that there had been so many cases of greatly inflamed arms as a result of vaccination. A new board of health, mayor, and board of aldermen had just been elected, and had assumed office about one week previous to my arrival. The new officers had taken hold of the situation with vigor; an unused factory building had been secured and was being converted into a smallpox hospital, and they were awaiting my arrival to determine what further measures to adopt. I advised that a suspect camp be established, to which all persons who had been exposed be taken and detained until the period of incubation had passed; that a corps of inspectors be organized; the city divided into a number of districts, and a house-to-house inspection be made by the inspectors, who should vaccinate all unprotected persons; that these inspectors should see every individual in his district at least every three days, and

more frequently if possible; that sufficient guards be employed to guard the smallpox hospital and suspect camp; that a disinfecting division be formed to disinfect promptly all houses in which cases of smallpox had appeared. I made out a plan of organization and suggested methods of putting it into practice. At the request of the board of health I appeared before the board of aldermen, assembled in special session to consider the situation, and outlined to them the measures that I considered necessary to suppress the epidemic. After hearing my statement, the board of aldermen appropriated the sum of \$3,000 additional for the suppression of smallpox. The board of health went vigorously to work to put into practice the suggestions offered, moving the patients to the new hospital, organizing a suspect camp, starting out a corps of inspectors, and otherwise taking the necessary steps to stamp out the disease. I called to pay my respects to His Excellency W. H. Ellerbe, governor of South Carolina, and was requested by him to investigate the situation relative to the dangers from smallpox to the State troops, whose mobilization at Columbia previous to being mustered into the service of the United States was being considered. In view of the fact that there were a number of unguarded cases of smallpox in the city, and that it was not possible with the knowledge then possessed to say to what extent the city was infected, I advised against the mobilization of troops at Columbia at that time.

I left Columbia in the afternoon of April 29, arriving at Sumter, S. C., the same evening. In company with Dr. C. S. Baker, president of the Sumter board of health, I visited the smallpox hospital and found 1 case of smallpox (a negro) in the third week of the disease. I also saw 2 cases (white) in the city; 1 in the third day of the disease and 1 in the third day of the eruption. I confirmed the diagnosis of smallpox in all these cases. I was informed that there were other cases in the city, making a total of 10 or 12. I advised the same measures as at Columbia. I met the mayor and the city council, explained the situation to them, and advised with them as to the measures to be taken to suppress the disease. They appropriated \$1,500 as an epidemic fund, and the board of health proceeded to put into effect the measures suggested. I left Sumter May 1, arriving at Wilmington the same afternoon. The disease continues to be of a mild type, but seems to be increasing in virulence. I noticed about a dozen confluent cases in the hospital at Columbia, one of which was dying at the time of my visit.

In each of these places that I have visited the authorities have expressed themselves as grateful to the Marine-Hospital Service, and said that the visit had been of great assistance to them. The fact that the type of the disease has been so mild, with but few deaths, has led to the diagnosis of chickenpox, etc., by some members of the profession, and "elephant itch," "nigger itch," and numerous other names that are unfamiliar to medical men, by the laity. All of this, with the fact that very much inflamed arms after vaccination have been the rule, rather than the exception, has led to marked apathy in handling the disease and strong opposition to compulsory vaccination. The statement of an officer of the Marine-Hospital Service, confirming the diagnosis of smallpox and pointing out the dangers the presence of this disease in the city involves, usually has the effect of arousing the people to a realization of the situation, and they promptly acquiesce in any measures required by the authorities for its suppression. In this way the Service is rendering great assistance to the people. Many physicians have never seen a case of smallpox, and are unfamiliar with the methods necessary for its suppression.

Respectfully, yours,

C. P. WERTENBAKER.

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

The following table of the prevalence of smallpox throughout the United States from the date of my last annual report to October 1, 1898, has been prepared in the division of sanitary reports and statistics in this Bureau:

Smallpox in the United States as reported to the Supervising Surgeon-General United States Marine-Hospital Service, November 1, 1897, to October 1, 1898.

Places.	Date.	Cases.	Deaths.	Remarks.
Alabama:				
Bessemer.....	Jan. 6-Feb. 19.....	143		
Birmingham.....	Nov. 1-Dec. 25.....	103	3	
	Jan. 6-Feb. 19.....	47		
	May 13.....	15		
In Jefferson County, out- side of the city.....	Feb. 6-Feb. 19.....	26		
Carneys Bluff.....	Dec. 22.....	1		
	Feb. 17.....			Smallpox reported.
Corona.....	Mar. 4.....	1		
Dolomite.....	Dec. 1-Jan. 17.....	21		
Gosport.....	Feb. 17.....			Do.
Glendon.....	Dec. 22.....	1		
	Feb. 17.....			Do.
Haynesville.....	Mar. 11.....	400		
Horse Creek Mine.....	Mar. 4.....	3		
Hurricane Bayou.....	Mar. 31-June 12.....	30		
Jackson.....	Feb. 17.....	10		
Letohatchie.....	May 13.....	50		
	July 30.....	25		3 miles from town.
McGrews Shoals.....	Dec. 22.....			Smallpox reported.
Mobile.....	Dec. 28-Jan. 26.....	2		
	Feb. 5-June 15.....	82	1	
	July 1-Aug. 17.....	9		
Montevallo.....	Mar. 3.....	1		
Montgomery.....	June 29.....	2		
Newton.....	Jan. 15-Feb. 2.....	7		
Nichola.....	Feb. 17.....			Do.
Oxmar.....	Jan. 19.....			Do.
Patton.....	Feb. 1-Mar. 4.....	9		
Pinckard.....	Feb. 2.....	50		
Port Deposit.....	May 13.....	1		
Rock Springs.....	Mar. 11.....	15		
Salitpa.....	Dec. 22.....	25		
	Feb. 17.....			Do.
Selma.....	Jan. 13-Feb. 14.....	3		
Shelby.....	Jan. 28-Apr. 22.....	8		
Talladega.....	Jan. 9-Feb. 15.....	45		
	Dec. 22.....	5		
Walker Springs.....	Feb. 17.....			Smallpox reported.
Wayne County.....	June 23-July 1.....	2		
Whistler.....	June 4-June 15.....	1		
Arkansas:				
Bebee.....	June 30.....	1		
Fair Oaks.....	Mar. 1.....	5		
Hot Springs.....	June 30.....	2		
Little Rock and vicinity.....	Mar. 31-May 20.....	110	1	
Newport.....	Apr. 28.....	1		
Sweet Home.....	May 20.....	11	1	
Colorado:				
Boulder County.....	June 24-July 26.....	5		
Colorado Canyon.....	Aug. 8.....	7		
Las Animas County.....	July 26.....	5		
District of Columbia:				
Washington.....	Feb. 7.....	1		Naval Hospital.
	Apr. 2-May 5.....	9		
	Aug. 13.....	1		
Florida:				
Bartow.....	June 25.....	1		
Bluff Springs.....	June 18.....	1		
Jacksonville.....	Mar. 20-Mar. 26.....	1		
Pensacola.....	Apr. 24-May 11.....	2		
Washington County.....	Jan. 24.....	12		
Georgia:				
Atlanta.....	Oct. 12-Nov. 30.....	102	1	
	Jan. 17-Feb. 16.....	178	2	Most cases from county.
	May 27-July 27.....	2		
Cartersville.....	Jan. 15-Mar. 1.....	9	1	
Griffin.....	Oct. 20-Dec. 2.....	19	1	
	Feb. 12.....	2		
Macon.....	Jan. 15-June 1.....	100	3	
Stilesboro.....	Jan. 15.....			Smallpox reported.

Smallpox in the United States, etc.—Continued.

Places.	Date.	Cases.	Deaths.	Remarks.
Illinois:				
Chicago	May 4	1 .....	.....
Indiana:				
Evansville	Feb. 26	1 .....	.....
Kentucky:				
Butler	Feb. 8-Feb. 24	1 .....	.....
Louisville	Apr. 16	1 .....	.....
Middlesboro	Feb. 3-Apr. 7	183	2	
Laurel County	July 20 .....	.....	.....	Smallpox reported.
Clay County	do .....	.....	.....	Do.
Jackson County	do .....	.....	.....	Do.
Louisiana:				
New Orleans	Mar. 13-May 21	5 .....	.....
Massachusetts:				
Greenfield	Feb. 5-Feb. 22	1 .....	.....
Holyoke	Dec. 23	2 .....	.....
Westfield	Feb. 20-Mar. 2	1 .....	.....
Michigan:				
Bay City	Oct. 27-Nov. 20	3 .....	.....
Ionia	Mar. 20-Apr. 23 .....	.....	.....	Do.
Royal Oak	Feb. 12-Mar. 12	1 .....	.....
Seneca Township	Aug. 6	1 .....	.....
	Aug. 27 .....	.....	.....	Do.
Mississippi:				
Basin	May 16	7 .....	.....
Chicora	June 23-July 1 .....	.....	.....	Cases reported.
Denny	May 16-May 31	19 .....	.....
Hattiesburg	June 4-June 15	3 .....	.....
Hendersons Point	Feb. 8	4 .....	.....
Laurel	May 28-July 28	11 .....	.....
Meridian	July 28	2 .....	.....
Moss Point	Feb. 15	1 .....	.....
Ocean Springs	Feb. 20	3 .....	.....
Prairie	June 4-June 15 .....	.....	.....	Several cases.
State Line	June 23-July 1	1 .....	.....
Shubuta, Clark County	May 28-June 15	50 .....	.....
New Jersey:				
Westfield	Mar. 4	1 .....	.....
New Mexico:				
Albuquerque and vicinity	Mar. 5-Sept. 4	52	3	Smallpox reported prevalent along the line of the Santa Fe R. R. August 4, 1898.
New York:				
Buffalo	May 21-June 18	1 .....	.....
Dausville	May	3 .....	.....
Deposit	Nov. 1-Nov. 30	1 .....	.....
Fredonia	May	25 .....	.....
Geneva	do	6 .....	.....
Ithaca	do	1 .....	.....
Livonia	July	1 .....	.....
Locke	May	1 .....	.....
Moravia	do	3 .....	.....
New York City	May 14-May 21	1 .....	.....
Rochester	May	3 .....	.....
Union Springs	do	2 .....	.....
Waverly	July	5 .....	.....
Westfield	May	3 .....	.....
West Sparta	do	2 .....	.....
North Carolina:				
Alamance County	Feb. 18-Feb. 25	1 .....	.....
Asheville	Apr. 14-July 19	1 .....	.....
Buncombe County	Apr. 16	1 .....	.....
Catawba	July 19	6 .....	.....	In one family.
Charlotte	Jan. 25-Feb. 12	4 .....	.....
Clay County	Feb. 15-Feb. 24	3 .....	.....
Cleveland	July 19	7 .....	.....	13 found recovered; total, 20 cases.
Durham	do	1 .....	.....
Elmwood	do	2 .....	.....
Iredell County	May 19-June 2	9 .....	.....
Mooreville	July 19	1 .....	.....
Reidsville	do	1 .....	.....
Wilmington	Jan. 12	1 .....	.....
Wilson County	May 28	1 .....	.....
Ohio:				
Bays	July 14	2 .....	.....
Cincinnati	May 5	1 .....	.....
Columbus	Apr. 16-Apr. 22	1 .....	.....
Delphos	May 4-July 14	15 .....	.....
Fairfield County	Apr. 8-May 11	12	1	
Goshen	July 28	15 .....	.....
Put in Bay	Sept. 6	26 .....	.....
Van Wert	June 23-July 15	13 .....	.....

Smallpox in the United States, etc.—Continued.

Places.	Date.	Cases.	Deaths.	Remarks.
Pennsylvania:				
Dunbar	June 23-July 13	6 .....	.....
Philadelphia	Apr. 13	2 .....	.....
South Carolina:				
Arkwright	Mar. 25	9 .....	.....	Smallpox reported.
Beaufort	Jan. 17 .....	.....	.....
Charleston	Apr. 22	1 .....	.....
Columbia	Apr. 6-May 2	86 .....	.....
Dyson	Mar. 25	3 .....	.....
Greenville	Jan. 17 .....	.....	.....	Do.
Orangeburg	do .....	.....	.....	Do.
Pelham	Mar. 25	20 .....	.....
Ridge Springs	do	1 .....	.....
Rockhill	Jan. 17 .....	.....	.....	Do.
Spartanburg	Jan. 17-July 26	4 .....	.....	Do.
Sumter	May 2	12 .....	.....
Swansea	Jan. 15 .....	.....	.....	Do.
Tennessee:				
Bristol	Mar. 1-Mar. 31	1 .....	.....
Chattanooga	Jan. 1-Apr. 30	21 .....	.....
Cleveland	Apr. 1-Apr. 30	6 .....	.....
.....	July 1-July 31	12 .....	.....
Elk Valley	Mar. 1-Mar. 31	1 .....	.....
Huntington (near)	Jan. 1-Jan. 29	1 .....	.....
Jellico	Feb. 1-Mar. 31	9 .....	.....
Johnson City	do	13 .....	.....
Knoxville	Jan. 1-Apr. 30	43 .....	.....
Lenoir City	Jan. 1-Feb. 28	5 .....	.....
Memphis	Jan. 22-Apr. 30	4 .....	.....
.....	July 1-July 31	2 .....	.....
Mingo Mines	Jan. 1-Jan. 29	6 .....	.....
Mingo	Feb. 1-Mar. 31	3 .....	.....
Morristown	do	6 .....	.....
Newcomb	Feb. 1-Feb. 28	3 .....	.....
Rockford	Mar. 1-Mar. 31	1 .....	.....
Rutledge	Feb. 1-Apr. 30	14 .....	.....
Shields Ferry	Mar. 1-Mar. 31	4 .....	.....
Sprawles	do	1 .....	.....
Texas:				
Brownsville	Feb. 26	1 .....	.....
Columbus	Feb. 2-Apr. 2	30	7	Smallpox reported.
Virginia:				
Colburn	Feb. 1 .....	.....	.....	Do.
Norfolk	Mar. 1-Mar. 10	2 .....	.....
Norton	Feb. 1 .....	.....	.....	Do.
West Virginia:				
Bluefield	Feb. 25	5 .....	.....
Fayette County	May 6	8 .....	.....
Mercer County	do	6 .....	.....
McDowell County	do	12 .....	.....
Wisconsin:				
Milwaukee	May 19	1 .....	.....
Oshkosh	Apr. 28	1 .....	.....

PRINCIPLES GOVERNING THE EXTENSION OF AID TO LOCAL AUTHORITIES IN THE MATTER OF SMALLPOX.

Smallpox is a disease so easily prevented by vaccination that the smallpox patient to-day is scarcely deserving of sympathy, the improvements in the preparation of pure vaccine lymph having been so great that there is now little cause for fear of untoward results from vaccination. The spread of disease also is so easily prevented under proper management that it is a disgrace to the sanitary authorities of any State, municipality, or locality whenever this disease is permitted to get beyond their control.

If the inability to manage the disease is due to a want of funds, then this lack of necessary provision is a disgrace to the legislative bodies of the State or locality infected.

This is one of the reasons why State and municipal boards of health should, as I have frequently expressed elsewhere, be perfected in the matter of their organization and endowments.

Expert assistance to determine the diagnosis and to advise as to preventive measures will always be furnished by the Bureau, but the position taken by the Marine-Hospital Service, by direction of the Secretary of the Treasury, when called upon for aid in suppressing small-pox is that it will give this aid only when necessary to prevent the spread from one State to another, and even then its assistance will be limited, so far as possible, to advisory and administrative aid rather than pecuniary, except under the most urgent circumstances.

PLAGUE.

During the last fiscal year bubonic plague has existed with much severity in India, especially in the presidency of Bombay, and while not extending in an aggravated form to Calcutta or Madras, has been present in both of those cities.

The facts hereinafter mentioned with regard to the disease in India have been obtained from United States consular reports and the reports of the Indian medical service, as published in the British Medical Journal.

EPIDEMIC IN BOMBAY.

The epidemic in the city of Bombay presents the following interesting features: Plague has been present in Bombay since its outbreak there in 1894, and during 1897 there was a recrudescence, as noted in my last annual report, of unusual severity in the city and neighborhood. As late as September 30, 1897, there were some 40 to 50 deaths a week in the city. The lowest record of deaths in Bombay from plague during the summer of 1897 was attained early in July, when the mortality from this cause fell to 9 per week. In August the average was about 20 deaths weekly, in September 40 to 50, in October 60, and in November and December there was a very decided increase, the week ended December 4, 1897, showing 83 deaths from this cause.

The following statistics show the increase in the mortality from plague by weeks up to the crest of the epidemic wave, which was early in March, 1898, and also its gradual decrease until a normal state of affairs was attained.

Deaths from plague by weeks from December 7, 1897, to June 21, 1898 (one week is missing, statistics unavailable), 95, 158, 200, 302, 450, 651, 834, 927, 1,113, 1,257, 1,082, 1,097, 1,283, 1,259, 978, 678, 562, 541, 442, 263, 109, 101, 84, 44, 26, 15, and by the end of June about 2 deaths a day, when a normal death rate was reached. There were in all during the period included between the dates given above 14,351 deaths reported, but it is presumable that very many deaths were concealed, and that consequently more than this number perished.

The same comparative freedom from the attacks of this disease which is usually enjoyed by Europeans held true in the outbreak in Bombay this year, as it did in the epidemic of the previous year, when (in 1897) out of a European population of 11,290 only 22 per-

sons died of plague—a mortality of 1.9 per cent—while of a native population of 821,764 there were 18,638 who fell victims to the disease—a mortality of 22.6 per cent. This comparative immunity seems also to have been enjoyed to a lesser extent probably by the Parsees and Mohammedans, both of which classes were almost exempt from plague.

Even among the Hindoos there was a difference among the sects as to the prevalence of plague, the sect of the “Jains” suffering much more severely than any other. No cause for the greater susceptibility of this sect can be surmised, unless that, being possessed of great wealth and unaccustomed to hardship, their general physique may have been lower and less resistant to the infection than that of some of the lower classes.

Physicians were sent out from England, quarantine measures enforced as rigidly as possible among the native population, what was known there as the “ward” system being used. The city was divided up into sections, each of these sections was surrounded every morning with a cordon of troops, everyone leaving this district was examined by a medical officer, and all the houses in the section were searched for sick and dead.

This epidemic, following closely on the one of 1897, shows clearly the virulence with which this disease rages among the natives of India. It is estimated that in the previous epidemic—1897, or, to speak more correctly, from October, 1896, to April, 1897—the actual mortality from plague in the city of Bombay was close on 20,000, while the mortality from it throughout the presidency of Bombay was not less than 70,000.

Before leaving the subject of plague in Bombay it is proper to state that while it had about disappeared by the end of June, 1898, it has increased in the succeeding months, as shown by the following table:

Week ending—	Deaths
July 5, 1898	38
July 12, 1898	53
July 19, 1898	63
July 26, 1898	69
August 2, 1898	
August 9, 1898	85
August 16, 1898	103
September 3, 1898	162
September 10, 1898	170
September 17, 1898	149
September 24, 1898	127
October 1, 1898	209
October 9, 1898	210
October 17, 1898	206

From this it would seem that the disease is following at Bombay a similar course to that pursued by it last year, and another epidemic during 1898-99 may be expected from the present indications.

The latest reports from the Bombay presidency—the third week in July, 1898—show that that section of India is by no means free from plague, as during that week the following localities were reported to be infected: Broach, Surat, Thana, Satara, Sholopore, Belgaum, Dharwar, Kathiawar, Baroda, Karachi, Kohlapore, Sachin, Bhore, and Cutch. The total number of deaths occurring in these localities during the week referred to was 840.

INFECTION OF OTHER INDIAN CITIES.

About the beginning of November, 1897, plague appeared in epidemic form at the city of Poona. There were in the hospital there on November 17 some 630 cases, and there was a daily mortality from plague of about 40. Indeed, at this date the epidemic here was more marked than at Bombay, where early in November there were not above 10 deaths daily. Poona was at this date the center of a plague epidemic. Sholopore, on the line of railway between Bombay and Madras, 500 miles from Bombay, was also badly infected. So was the town of Hubli, on the railway south of Bombay and inland from the Portuguese settlement of Goa. The disease was also reported to exist in Hardwar, 1,800 miles north of Bombay, close to the Himalayan Mountains, and a place of pilgrimage, and at Khatkar Khan Kalan, in the district of Jalandhar, a place on the railroad to Hardwar.

The epidemic at Poona continued with unabated severity throughout November, December, and January. Reports received during January show that up to that date from the inception of the epidemic there had been almost 6,000 cases, with more than 4,300 deaths, with a mortality among cases treated outside the hospital of 80.5, while among those treated in the plague hospital the mortality was not greater than 66 per cent.

Toward the end of January, 1898, the epidemic in Poona began to abate and by the end of February the epidemic might almost have been considered to have been at an end, the mortality from plague ceasing during the following month.

Another badly infected locality was the city of Karachi, where there was a recrudescence of plague about the end of September, 1897, which lasted throughout the winter months and finally disappeared, only to reappear in more intense form about the beginning of April, 1898. This second epidemic at Karachi was reported to be kept "well in hand," but the reports show that up to May 6, 1898, there had been 1,007 cases, with 740 deaths; during the interval between the 4th and 10th of May there were 625 cases, with 488 deaths. The disease showed no signs of abatement until June 1, 1898, since which date it steadily declined. Other towns infected during the winter were Surat, Sholopan, and many localities within the Bombay presidency, where on January 8, 1898, plague was reported to be "raging fiercely."

Three cases and one death from plague occurred in Madras on October 16, 1897, but there was no spread of the disease. This is of importance only from the fact that there is no record of the disease ever having occurred previously in that city.

Toward the end of January, 1898, the disease had spread to Hyderabad, Sarati, Kashegeon, Dhoti, and Warligeon.

In the district of the Punjab to date of May 15, 1898, there had been 1,369 cases of plague recorded, with 1,022 deaths.

The disease was probably spread from Bombay to Calcutta, where it appeared about the latter part of April, 1898. To May 1 there had been 26 cases and 12 deaths from plague there, but it never assumed epidemic proportions, and but few additional cases have been reported.

REPORT ON THE PLAGUE IN CALCUTTA,

By the UNITED STATES CONSUL-GENERAL.

CALCUTTA, *May 4, 1898.*

SIR: In continuation of my dispatch, No. 54, dated April 27 last, in which I said that there had been a number of suspicious cases in Calcutta, but that the health officer had not decided whether they were well-defined cases of bubonic plague, or not, I now have the honor to inclose herewith a report of the proceedings of the legislative council of Bengal, with the remarks of the lieutenant-governor published in the *Englishman* of the 2d instant, announcing that plague exists in Calcutta, but that so far there had been but about 25 cases and 12 deaths in ten days, scattered through the various parts of the city, but I have cabled for your information "Plague sporadic." When it is considered that the population of Calcutta is about 800,000, it will be seen how infinitesimal is the number compared with the population.

As will be seen by the report inclosed, the government is taking prompt, and what is hoped will prove effective, measure to prevent the spread of the disease.

There has been a panic in the city among the native population, more from the fear that the zenana (the women's rooms) will be violated in the house-to-house inspection, the enforcement of segregation, and the separation of families, as was done in Bombay, Poona, Karachi, and other places, and that quarantine would prevent their escape from the city, than the fear of the plague itself, but the publication of the measures to be adopted by the legislative council and the assurances of the lieutenant-governor have allayed the excitement, and those running will await further developments of the disease.

Fortunately, it has come at a time of year which is the least advantageous to its spread, and the measures adopted may prevent it assuming an epidemic form which, in the present condition of the native quarter, with its narrow, crowded streets and unsanitary condition, would result not only in sweeping away a large proportion of the population but to practically destroy the large foreign commerce on which Calcutta so largely depends for its prosperity.

I am, sir, your obedient servant,

E. F. PATTERSON,
United States Consul-General.

PLAGUE IN OTHER COUNTRIES.

A few cases were reported from Djiddah toward the end of March, 1898, but although for some time these cases were a source of grave apprehension to Egypt and southeastern Europe, on account of the

risk of the pilgrims to the Hedjaz bringing home with them plague infection, the disease did not spread, and there were in all not more than 40 cases at that place.

No cases of plague were reported in Djiddah later than April 19.

A full description of the outbreak, together with the preventive measures adopted by the International Sanitary Commission at Constantinople, was transmitted to the Bureau by Dr. Zavitziano, the United States representative on said sanitary commission, and published in the public health reports for May 6, 1898.

Another statement on the same subject, by the British consul at Djiddah in a report to the British ambassador, was published in the public health reports for July 15, 1898.

A case of plague was taken from the steamship *Mahale*, which arrived at Suez from Djiddah April 30, 1898.

In China plague was present during the year at Hongkong, where it had existed in a mild and sporadic form since January 1, 1898.

According to reports received in this office from that time until the end of June there had been about 1,200 deaths from it in the city, but, as usual, it was confined almost exclusively to the native population.

PLAGUE AT HONGKONG, JANUARY 1 TO JULY 8, 1898.

YOKOHAMA, JAPAN, August 17, 1898.

SIR: I have the honor to forward for your information the subjoined summary statement of the occurrence and mortality of plague in Hongkong from January 1 to July 8, when it practically ceased to be epidemic. This report I have received from official sources, and it is to be relied upon.

Return of plague cases, January 1 to July 8, 1898.

Europeans, 36 cases, 16 deaths; Chinese, 1,236 cases, 1,118 deaths; other races, 39 cases, 21 deaths; total, 1,311 cases, 1,155 deaths. The death rate was, therefore, 88.1 per cent.

I am, sir, very respectfully, your obedient servant,

STUART ELDRIDGE, M. D.,
Sanitary Inspector, U. S. M. H. S.

The SUPERVISING SURGEON-GENERAL,
United States Marine-Hospital Service.

Other infected localities were Amoy, where plague was declared to be epidemic on June 11, 1898; Canton, where a few cases appeared early in the spring; Swatow and Macao, where plague was reported at about the same date, and Formosa, where a severe epidemic existed, especially at the ports of Taipeh, Tainan, and Taiwan. Between April 29, 1898, and June 15 there had been reported 2,338 cases in these three ports, of which 1,483 were fatal.

Late reports from China state that many thousands of people have died there during the past few months of a pneumonic form of plague, but trustworthy statistics are wanting. The southern ports appear fairly free from plague, but the same can not be said of Amoy. The disease has almost disappeared at Hongkong.

The following letter relative to the plague at Amoy has been received from the United States consul at that point:

REPORT ON THE EPIDEMIC OF PLAGUE IN AMOY.

AMOY, CHINA, *June 14, 1898.*

SIR: I have the honor to report that on June 11 I cabled you as follows: "Amoy, June 11, 1898. State Department, Washington: Plague. Johnson;" which I now confirm.

The bubonic plague appeared in this port about May 20. Only a few cases were reported up to June 5, when it suddenly developed rapidly, and on June 8 the consular surgeon, in his report for a ship bound to San Francisco, reported about 20 deaths daily, and that in his opinion the disease was then existing in an epidemic form. Since that time it has been on the increase. During the present week very warm, dry weather has prevailed; and if it continues, the spread of the epidemic will be checked, as the hot sun is fatal to the plague germs.

In three cities within a distance of 30 miles from Amoy plague has been epidemic for thirty days. There being no official records kept of such matters in China, the actual number of deaths can only be approximated, but from estimates based upon the increased number of coffins sold and reports from Mission Hospital authorities, the average death rate in the three cities aggregates not less than 100 daily.

I have the honor, etc.,

A. BURLINGAME JOHNSON.

United States Consul.

The ASSISTANT SECRETARY OF STATE.

One case of plague was removed from the steamship *Carthage*, arriving at Aden from Bombay on July 28, 1898, and some seven cases were brought to Woosung, China, by the steamship *Glenturret*, as reported by the United States consul-general at Shanghai in the following letter:

PLAGUE ON BOARD THE GLENTURRET AT SHANGHAI.

CONSULATE-GENERAL, UNITED STATES OF AMERICA,

Shanghai, April 21, 1898.

SIR: I have the honor to inclose and make a part of this report the following account of the arrival of the ship *Glenturret* at Shanghai with plague on board:

"At last the much-dreaded plague has reached North China waters and has gotten so close to Shanghai as Woosung. The Glen Liner *Glenturret*, Captain Webster, from London via Hongkong, arrived on Saturday morning and reported the death of a native on board from what was believed, and was afterwards found, to be bubonic plague. The vessel was at once placed in quarantine and all communication with the shore rigidly forbidden. To-day it is reported that 6 cases, which had developed suspicious symptoms yesterday, have proved fatal, making 7 victims in all, 1 having died yesterday. Customs launches are actively engaged at the ship in order to enforce the quarantine regulations. The isolation depot at the Point, always kept in a general state of readiness, is now being prepared for the immediate reception of the natives from the *Glenturret*."

No more cases or deaths have been reported to the present time.

I have the honor to be, sir, your obedient servant,

JOHN GOODNOW, *Consul-General.*

The ASSISTANT SECRETARY OF STATE.

Prevalence of plague during the fiscal year 1898, as reported to the

United States Marine-Hospital Service, and as obtained from reports in the British Medical Journal:

PLAGUE.

Places.	Date.	Cases.	Deaths.	Remarks.
Arabia:				
Aden	July 28	1	1	Patient removed from steamship Carthage from Bombay.
Djiddah	Mar. 22-Apr. 16		34	
Nuslah	Mar. 1-Mar. 25	1		
China:				
Amoy	June 11			Plague reported. June 14, 20 deaths a day. Under date of June 14, the United States consul reports that in Amoy and three adjacent cities the deaths amount to "not less than 100 daily."
Canton	Mar. 22-Apr. 5	10		
Hongkong	Nov. 7-Nov. 20	2	2	
	Dec. 18-Jan. 1	2	2	
	Jan. 2-Jan. 29	6	5	
	Jan. 30-Feb. 26	64	56	
	Feb. 27-Apr. 30	596	529	
	Apr. 30-May 28	518	443	
	June 1-June 14	131	91	
	June 4-June 25		134	
Swatow	Mar. 25			Do.
Macao	Apr. 9			Do.
Shanghai	Apr. 23			On steamship Glenturret, in quarantine.
Egypt:				
Suez	May 5			1 case plague on steamship Mahale.
India:				
Bombay	Nov. 24-Nov. 30		70	Plague reported. "Sporadic." May 28.
	Dec. 1-Feb. 8		4,833	
	Feb. 9-Mar. 1		3,436	
	Mar. 2-Mar. 29		4,579	
	Mar. 30-May 17		2,731	
	June 1-June 28		94	
	July 5-July 12		53	
Calcutta	Apr. 25-May 4	26	12	
	June 25-July 2		20	
Poona	Nov. '97-Feb. '98		4,300	
Karachi	Nov. '97-May 6, '98	1,007	740	In quarantine on steamship Peru.
	May 4-May 10	625	488	
	May 4-May 15, '98	1,369	1,022	
Punjab district				
Japan:				
Hiogo	May 19-June 5	1	1	In quarantine, steamship Hi-kozan Maru.
Osaka and Hiogo	May 21-May 28	1	1	
Taiwan, Formosa	Dec. 28-Apr. 28	505	84	
Formosa ports (Taipeh-Tainan and Taiwan.)	Apr. 29-June 15	2,338	1,483	
Yokohama	Mar. 1-Apr. 11	2	1	
Nagasaki	June 6-June 15	1	1	
Russia:				
St. Petersburg	Mar. 26-Apr. 2		1	

NOTE.—Other localities in India infected with plague during 1897-98 were the following: Broach, Surat, Thana, Satara, Sholopore, Belgaum, Dharwar, Kathiawar, Baroda, Kohlapore, Sachin, Bhor, Cutch, Hibli, Hardwar, Khatkar Khan Kalan, Hyderabad, Sarati, Kashegeon, Dhoti, Warligeon.

REGULATIONS TO PREVENT THE INTRODUCTION OF PLAGUE INTO MOROCCO.

DEPARTMENT OF STATE,
Washington, D. C., May 16, 1898.

SIR: I have the honor to inclose for your information a copy of a dispatch from the consul-general at Tangier in regard to the steps which are being taken to keep the plague out of Morocco.

Respectfully, yours,

THOS. W. CRIDLER,
Third Assistant Secretary.

The SECRETARY OF THE TREASURY.

[Inclosure No. 1.]

CONSULATE-GENERAL OF THE UNITED STATES,

Tangier, April 27, 1898.

SIR: I have the honor to acknowledge the receipt of your instruction No. 31 of the 6th instant, relative to the issuance of health certificates by the consular agent at Mogador. According to my information from Mr. Burke and from leading shippers, the practice of taking out these certificates to accompany shipments of goat skins or hides to the United States has prevailed at this and other Moorish ports for many years. It existed long prior to the epidemic of cholera here three years ago. I do not find that they are required with similar shipments to other countries, and some time ago I informed the principal shipper here that I knew of no reason for their issuance. He preferred, however, to take them out, and although I have acquainted him with the Department's present instruction, he still expresses the desire to do so until his consignees direct him otherwise. He tells me that while making a shipment some months ago via Gibraltar and the Anchor Line the agent at Gibraltar wrote him to send such a certificate.

I have now notified all consular agents at ports from which shipments are made that certificates that the port of shipment is free from cholera or other contagious or cattle diseases are no longer required by the Government of the United States with shipments of goat skins or hides, and I have directed them to so inform shippers. I have added that if shippers desire a certificate for any reason of their own they may take them out, but that is optional with them. I will likewise inform shippers at this port.

In this connection I have the honor to report that the necessity for circumspection in connection with the receipt of goat skins and hides into the United States from Morocco may soon arise. Since the appearance of the plague at Djiddah the diplomatic corps here have strenuously endeavored to persuade the Moorish Government to prohibit the annual pilgrimage to Mecca this year, but without avail. Last year in deference to the representation of the corps the Government did prohibit the pilgrimage, but it has refused to do so this year. The grand vizier says that "the pilgrimage is one of the great essential precepts of religion and ordained by divine law, and neither the Makhzen [Moorish Government] nor anybody can interfere with the shra so as to deny the divine ordinances being followed by their adherents." And he adds that "although they [the Moors] may be fully aware that one of them going thither will never return, and that death would result to all of them, yet they would desire it and seek it, willingly spending their money and sacrificing themselves in obeying the divine law in joy and gladness."

At the same time the grand vizier expressed a willingness to consider the establishment of a quarantine station for returning pilgrims, and negotiations with respect thereto are now proceeding. The diplomatic corps, acting as a sanitary council under certain rights and privileges heretofore granted them by the Moorish Government, have decided to put in force from May 1 next the regulations of 1896 respecting the arrival of Mohammedan travelers at Moorish ports. I inclose a copy of the same herewith. If the plague should prevail to any extent among the Mohammedan pilgrims, notwithstanding the precautions taken, there is danger of its introduction into Morocco. Some pilgrims go overland, and such a pilgrimage is counted as more meritorious.

The Italian Government has already forbidden the importation into Italy of any skins or hides from Morocco or other Barbary States, as a precautionary measure. The other governments have not done so, nor can I see any present necessity for such a precaution, as the pilgrims have not yet begun to return, and there is no suspicion of the plague here at present. I will keep the Department informed of any new developments.

I am, sir, your obedient servant,

FRANK C. PARTRIDGE,
United States Consul-General.

The ASSISTANT SECRETARY OF STATE.

[Inclosure No. 2—Dispatch No. 37.]

REGULATIONS CONCERNING THE ARRIVAL OF PILGRIMS AT THE MOORISH PORTS.

Article 1. Vessels having pilgrims on board—that is to say, native Arabs who have made the voyage to Mecca at the end of the Mussulman year which precedes that in which they return to Morocco—will be sent to the lazaretto of Mogador Island, where the pilgrims will disembark to be submitted to a quarantine of observation and disinfection.

Art. 2. Vessels bringing a number of pilgrims under 25 will not be sent to the Mogador Island, but the pilgrims will be submitted, in each case, they and their baggage, to a disinfection, and the sanitary council besides reserves to itself the right of submitting them to a quarantine of observation.

Art. 3. All Arabs and natives who arrive at Morocco in the course of the first five months of the Mussulman year will be considered and treated as pilgrims unless they are able to prove that they have not been at Mecca at the end of the preceding Mussulman year. Those pilgrims who have been admitted into the town of Gibraltar or a Spanish port will be exempt from the above, providing they prove this fact by a certificate from the authorities thereof.

Art. 4. To facilitate the control, the sanitary delegate at Tangier will deliver gratuitously to each Moor who should go to Gibraltar, Algeciras, or Cadiz during the first five months of the year a personal pass available only for his journey to and from the port, which pass must be delivered to the sanitary delegate on the bearer's return.

Art. 5. The expenses caused by the measures mentioned in article 2 will be defrayed by those interested, viz, the shipping companies.

Art. 6. The present rule does not abrogate that of October 24, 1892, which remains in vigor for all dispositions that are not in contradiction with the preceding articles.

BUSSCHE, *President*.

TANGIER, *September 17, 1896*.

RUSSIAN AND FRENCH RESTRICTIONS ON THE PILGRIMAGES.

The Russian Government in the following communication forbade the pilgrimage unless it could be shown that the quarantine measures enforced in the Persian ports of the Persian Gulf were sufficient to prevent the introduction of the disease into Russia:

[Communication made by the delegate of Russia at the sitting of the Superior Council of Health of February 27, 1898.]

I am authorized by my chief to inform the council as follows:

The commission presided over by the Prince of Oldenburg for the putting in force throughout the Empire of Russia of measures of prevention against plague has notified my embassy that the Government of the Czar, in view of the progressive recrudescence of plague in India and the fact that the quarantine instituted by the council of health of Teheran against arrivals from India at Bender-Abbas, Bouchir, Lingar, and Mohammara has not an effective character, and that acts of contraband trade are of frequent occurrence, according to the reports of the Russian consuls residing in those localities; and finally considering that this state of things constitutes an incessant menace of contamination for Persia and Turkey, and consequently for Russia, which is contiguous to these countries, the Government of the Czar has, for the reasons named, prohibited to its subjects the pilgrimage to the holy places of the Hedjaz.

However, the English delegate has furnished official information with regard

to the quarantine imposed in the Persian ports of the Persian Gulf, as well as at Muscat, against arrivals from Hindustan, a quarantine which should be effective. If this information is confirmed by the statement which is expected on the same subject from the Sublime Porte and from the foreign missions represented in this council, it is very probable that the Government of the Czar will withdraw the prohibition of which I have had the honor to inform you.

The French Government also prohibited the pilgrimage within the Algerine jurisdiction, as follows:

FRENCH GOVERNMENT PROHIBITS PILGRIMAGES FROM ALGERIA AND TUNIS.

[Communication of the delegate of France read at the sitting of the Superior Council of Health, February 15, 1898.]

CONSTANTINOPLE, *February 15, 1898.*

By reason of the recrudescence of plague and the appearance of cholera in India, as well as on account of the restrictive measures applied to the departure of Hindoo pilgrims for the holy places, the Government of the Republic finds itself under the necessity of prohibiting the pilgrimage within the Algerine jurisdiction.

A similar prohibition has been put in force for Tunis.

Dr. E. DELACOUR,
Delegate of France.

STRICT ENFORCEMENT OF PREVENTIVE MEASURES URGED UPON THE
OTTOMAN GOVERNMENT.

In reply to a request from the honorable the Secretary of State, the following letter regarding the care to be taken by the Ottoman Government to prevent the introduction of plague into Europe was addressed to him by yourself:

TREASURY DEPARTMENT,
Washington, D. C., May 27, 1898.

SIR: I have to acknowledge receipt of your letter of the 16th instant, inclosing a copy of a dispatch from our minister at Constantinople reporting that the diplomatic body at that capital has made a request to the Ottoman Government for a strict enforcement of the sanitary regulations to prevent the spread of bubonic plague, in which you desire an expression of my views in the matter.

In reply I have respectfully to state that the action of our minister at Constantinople, in conjunction with diplomatic representatives of other countries, is to be highly commended and is approved by this Department, with the hope that the Ottoman Government may be more efficient in the enforcement of its sanitary regulations upon receiving the conjoint recommendations of the several powers.

Respectfully, yours,

L. J. GAGE, *Secretary.*

The SECRETARY OF STATE.

HAFFKINE'S SERUM—PREVENTIVE INOCULATION.

According to reports in the British Medical Journal from the special correspondents of that publication in India there has been a change in the sentiment of the native population with regard to the use of antiplague inoculation.

The natives in many places have been fully convinced of the beneficence of the measure and many come forward voluntarily to receive treatment.

The following quotation from the British Medical Journal of February 5, 1898, gives the latest statistical information regarding the value of antiplague inoculation in India:

At a lecture delivered at Poona M. Haffline claimed for his method a substantial success, and he quotes the following facts in support of his contention: First, as regards animals being rendered immune. Twenty rats from a ship newly arrived from Europe were seized. Of these 10 were inoculated. Subsequently the 20 rats were kept together in a cage into which a rat suffering with plague was introduced. Of the uninoculated 9 were seized with plague and died, whereas of those rendered immune only 1 contracted the disease. Secondly. At Uran, a village possessing 1,000 inhabitants, when plague broke out 429 persons were inoculated by the serum in question. Of these only 7 were attacked by plague and all recovered, while of the uninoculated 26 were seized and 24 died. Thirdly. In the town of Lower Damann 2,197 persons were inoculated, 6,033 remaining unprotected. Of the latter 1,482 died, whereas only 36 of the persons inoculated succumbed to the disease. Fourthly. At Lanowli, a village with 700 inhabitants, some two hours' distance from Bombay, 323 persons were inoculated, and 377 were content to remain unprotected. Among the former there were 14 cases and 7 deaths; among the latter—that is, the uninoculated—78 persons contracted the disease, of whom 58 died. Fifthly. At Kirkee, out of a total of 1,530 inhabitants 671 availed themselves of the treatment, while 859 remained unprotected. Of the latter 143 had plague with 98 deaths, whereas of the inoculated 32 cases occurred, with 17 deaths only."

These results are very striking, and few dwellers in a plague-stricken community will have the courage to run the risk of not utilizing this method of treatment, however much they may in theory traduce the benefits claimed for it.

LEPROSY.

The following statistics of leprosy, showing its prevalence and geographical distribution, are of interest in view of the fact of the growing commercial relations of the United States with the Japanese States.

As seen from this report, there are upward of 23,000 cases of leprosy reported as such throughout the various prefectures of Japan at the time these investigations were made.

LEPROSY IN JAPAN.

UNITED STATES CONSULATE-GENERAL,
Yokohama, January 18, 1898.

SIR: The inclosed clipping furnishes much valuable information concerning the prevalence of leprosy in Japan.

I have the honor to be, sir, your obedient servant,

JOHN F. GOWEY,
Consul-General.

The ASSISTANT SECRETARY OF STATE.

[Inclosure.]

STATISTICS ON LEPROSY.

According to the investigations of the sanitary bureau of the home office, the number of lepers in Japan in September last was as follows:

Prefectures.	No.	Place of infection.		Not known.	Prefectures.	No.	Place of infection.		Not known.
		Within the jurisdiction of the prefecture named.	Out of the jurisdiction of the prefecture named.				Within the jurisdiction of the prefecture named.	Out of the jurisdiction of the prefecture named.	
Tokyo.....	374			374	Akita.....	212	190	2	11
Kyoto.....	158	157	1		Fukui.....	44	44		
Osaka.....	372	▲ 186	186		Ishikawa.....	165	164	1	
Kanagawa.....	118	112	3	3	Toyama.....	121	121		
Hio-go.....	518	514	4		Tottori.....	222	222		
Nagasaki.....	408	744	25		Shimane.....	313	310	3	
Niigata.....	408	204	204		Okayama.....	626	624	2	
Saitama.....	369	352	17		Hiroshima.....	572	564	8	
Chiba.....	657	652	5		Yamaguchi.....	748	740	8	
Ibaraki.....	448	442	6		Wakayama.....	230	199	31	
Gumma.....	626	427	199		Tokushima.....	538	521	17	
Tochigi.....	351	43	308		Kagawa.....	395	357	38	
Nara.....	125	125			Ehime.....	466	462	4	
Miye.....	455	455			Kochi.....	413	392	21	
Aichi.....	1,019	1,008	11		Fukuoka.....	1,254	1,176	58	
Shizuoka.....	529	529			Oita.....	955	855	2	98
Yamanashi.....	300	276	24		Saga.....	527	516	11	
Shiga.....	275	273	2		Kumamoto.....	2,473	2,386	87	
Gifu.....	691	679	12		Miyazaki.....	897	897		
Miyagi.....	111	97	14		Kagoshima.....	603	603		
Fukushima.....	649	637	12		Okinawa.....	546	546		
Iwate.....	561	556	5		Hokkaido.....				
Aomori.....	678	677	1						
Yamagata.....	412	409	3						
					Total.....	23,647	21,824	1,328	495

It is stated that among the Ainu population (17,314) of Hokkaido no leprosy case is reported. The number of lepers among immigrants has not been ascertained as yet, the only information given being that 6 lepers were treated at the Sapporo Hospital since last year. We learn that it is almost universally recognized by the medical authorities that leprosy is a contagious disease, and that the terrible disease is most prevalent where fish is most freely used as an article of food.

I also submit the following report on leprosy in the Kingdom of Denmark, together with a translation of certain Danish laws on the subject of lepers and their isolation, etc., furnished to this office through the courtesy of the United States vice-consul at Copenhagen, Denmark:

LEPROSY IN THE KINGDOM OF DENMARK, INCLUDING ICELAND AND THE DANISH WEST INDIES.

By the UNITED STATES VICE AND DEPUTY CONSUL, Copenhagen.

A new law has just been signed about the lepers in Iceland. A special hospital, a gift from the Danish branch of the Independent Order of Odd Fellows, was built in Copenhagen last winter, and it is now on its way to Reykjavik, Iceland, where it is to be opened on July 24, 1898.

Referring to this consulate's report about leprosy in Iceland, dated January 7, 1895, Dr. Ehlers informs me that the last time (summer of 1895) he was in Iceland there were 181 known lepers. He thinks, however, that there must be over 200, but the new law must settle this question, as every leper's name has to be entered in a special protocol, and he is, by law, compelled to report.

Unfortunately, leprosy exists also in the Danish West Indies. The official statistics, which, however, are considered too low, estimate the number of lepers at St. Thomas, Danish West Indies, 22 patients: St. Croix, Danish West Indies, 82 patients, of whom only 23 are in the hospitals, as no compulsory law exists.

The Kingdom of Denmark proper is not known to have any lepers, although it is not impossible that Copenhagen, as all larger cities in Europe, has a few who have contracted the disease abroad. Dr. Ehlers, who is the greatest authority in Denmark and whose name is known throughout the world for his great work in the interest of the unfortunate lepers, divides the disease into two classes—(1) tuberculous and mixed leprosy, and (2) pure anæsthetic leprosy. The latter is not considered contagious, as the bacilli of this disease are not found in any tissues except the nerves. It is, therefore, the intention to isolate first the patients suffering from tuberculous and mixed leprosy.

I inclose translation of the two laws.

[Translation—Inclosure No. 1.]

LAW ABOUT THE ESTABLISHMENT AND WORKING OF A HOSPITAL FOR LEPERS AT REYKJAVIK, ICELAND.

COPENHAGEN, *February 4, 1898.*

PAR. 1. When a hospital for lepers at Reykjavik has been finished and handed over to the Government, a sum of 16,000 kroner (\$4,288) may be expended in furnishing it.

PAR. 2. A special doctor shall be appointed to the hospital, and his salary shall be 2,700 kroner (\$723.60). This doctor shall, besides his duties as doctor at the hospital and superintendent over the same, without special compensation, teach the pupils at the doctor school in one or more branches of instruction.

PAR. 3. The yearly expenses for the working of the hospital shall be granted by the finance committee.

PAR. 4. Patients are placed in the hospital subject to the laws now in force. If there is room for more, then other lepers who themselves express the wish can be placed in the hospital.

PAR. 5. The hospital committee consists of the governor for the south and west counties and the surgeon-general of Iceland.

Should the branch of the Odd Fellows' Association in Denmark establish a branch in Iceland, then its committee has the right to appoint a member of the same to the hospital committee. The governor of Iceland draws up rules for the hospital and its officers.

THE MINISTRY FOR ICELAND.

[Translation—Inclosure No. 2.]

LAW ABOUT LEPERS' ISOLATION AND PLACING IN A PUBLIC HOSPITAL.

COPENHAGEN, *February 4, 1898.*

PAR. 1. The names of all lepers must be entered in a special protocol by every county physician. The protocol shall be arranged by the surgeon-general and the special leper doctor, and the cost of the same shall be paid by the Government. Once a year the county physicians must send the surgeon-general an extract of the protocol.

PAR. 2. When a leper moves from one county to another, then the doctor in his county has to inform the doctor in the other county of the removal.

PAR. 3. The doctor must carefully watch the lepers' mode of living in their districts; they must inform the lepers and the persons living with them of the necessary precautions to be taken by the lepers themselves, and by the others, in order to avoid the communication of the disease to the latter. The doctors must enforce these instructions.

The board of health inspectors are instructed to help the doctors to the best of their ability.

PAR. 4. The lepers must always follow the following rules, viz:

1. Lepers must not sleep in the same bed with others, married people, however, excepted, unless the doctor decides otherwise.

2. Every leper shall have his own cuspidor, and he must not spit on the floor.

3. He must have special plates, knives, forks, and spoons, tablecloth, etc., which he only must use.

4. Lepers' bedsheets, wearing apparel, plates, knives, forks, spoons, and tablecloth must be cleaned and washed separately. The bandages for the sores must, after use, be burnt or disinfected by being boiled in water for at least one-half hour.

5. Lepers are forbidden to tend children, wait on nonlepers, and cook for others.

6. Lepers are forbidden to visit others and receive visits from others.

Extraordinary precautions, prescribed by the doctor, under any given circumstances, must be implicitly obeyed by the lepers.

PAR. 5. Rooms occupied by a leper must not be used by others unless disinfected, as instructed by the doctor. Wearing apparel, bedclothes, etc., used by a leper must also be disinfected.

PAR. 6. Should a leper die or remove to another place, then the owner of the leper's former home must immediately inform the inspector or the police, who, within a fortnight, must inform the respective doctor thereof. The latter must, without delay, see that the leper's rooms, wearing apparel, bedclothes, etc., which he has left on the spot, be sufficiently disinfected.

PAR. 7. Lepers who receive help from the public charity association must, when the county physician considers it necessary, be placed in the hospital for lepers.

If no room, then the party must be placed so that there is a guaranty that the rules prescribed in paragraph 4 are complied with.

The placing of these lepers should, when circumstances permit, be made so that married couples are not separated against their will. Should the doctor's decision bring about such a separation, then it is only legal if sanctioned by the governor. Children of leprous parents, who receive help from the public charity association, shall always be reared in outside homes.

The municipality must not, without the doctor's consent, place poorhouse inmates in homes where lepers already live.

PAR. 8. The placing of other lepers in the lepers' hospital can be authorized by the governor in exceptional cases upon the recommendation of the respective municipality and doctor. This can, however, only take place when either the rules given in paragraph 4 or the extraordinary precautions mentioned in the last sentence of the same paragraph have not been strictly complied with or the doctor thinks that the illness and danger of contagion are of such a serious nature that the placing of the individual is necessary.

In the cases here mentioned it is also understood that married couples are not to be separated against their will, except under exceptional circumstances.

PAR. 9. When this law comes into force the assistance of the police can, when necessary, be called upon for placing lepers in the hospital.

PAR. 10. All the expenses for the lepers' maintenance in the lepers' hospital, as well as the expenses for bringing them there, in accordance with paragraph 8, are paid by the county treasurer. The placing in the hospital of lepers in accordance with paragraph 7 must be paid by the municipality. The expenses, by renewed placing of a patient who has left the hospital without the manager's permission, must be paid by himself, provided he has the means for so doing.

PAR. 11. Traveling expenses incurred by the doctors, in accordance with this law, are refunded to them on the same terms as if for public service. All disbursements and expenses for disinfection, in accordance with paragraph 6, must be paid by the county treasurer.

PAR. 12. Contraventions of the rules given in paragraph 5 and omission to report, in accordance with paragraph 6, are punished with fines of up to 200 kroner (\$53.60), and are imposed by the police.

PAR. 13. This law takes effect three months after the date the official notice that the lepers' hospital is or will be ready has been inserted in the Government's newspaper under Division B.

THE MINISTRY FOR ICELAND.

COPENHAGEN, *March 26, 1898.*

INVESTIGATION OF LEPROSY.

With your approval, a bill authorizing the thorough investigation of the subject of leprosy in the United States was prepared and presented to Congress. This bill provided for such investigation to be undertaken by this Service through its medical officers, and I earnestly recommended that it be passed. It did pass the Senate on the 22d of January, 1898, and has been favorably reported by the House Committee on Interstate and Foreign Commerce.

The necessity of this legislation is increased by the acquisition of the Hawaiian Islands, which, it is understood, are to be a Territory of the United States. The well-known existence of leprosy in these islands gives additional importance to this measure.

Following is the bill and the report of the Committee on Public Health and National Quarantine, to which it was referred:

AN ACT for the investigation of leprosy.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That the Supervising Surgeon-General of the Marine-Hospital Service, under the direction of the Secretary of the Treasury, shall appoint a commission of medical officers of the Marine-Hospital Service to investigate the origin and prevalence of leprosy in the United States, and to report upon what legislation is necessary for the prevention of the spread of this disease; the expenses of this investigation, not exceeding the sum of five thousand dollars, to be paid from the fund for preventing the spread of epidemic diseases.

[Senate Report No. 463, Fifty-fifth Congress, second session.]

INVESTIGATION OF LEPROSY.

The Committee on Public Health and National Quarantine, to whom was referred the bill (S. 2904) for the investigation of leprosy, have examined the same and report:

The reasons for the proposed legislation are fully set forth in the following letter from the Supervising Surgeon-General of the Marine-Hospital Service:

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., January 13, 1898.

HON. GEORGE G. VEST,

*Chairman Committee on Public Health and
National Quarantine, United States Senate.*

SIR: I have the honor to acknowledge the receipt of your letter of the 6th instant, referring to Senate bill No. 2904, with the request that I furnish your committee

with such suggestions as I may deem proper in the premises touching on the merits of the bill and the propriety of its passage.

With regard to Senate bill 2904, authorizing the Surgeon-General of the Marine-Hospital Service to cause an investigation to be made relative to the origin and prevalence of leprosy in the United States, I have to state that in view of the fact that leprosy is known to exist in quite a number of places in this country there is a prevailing opinion among the sanitary authorities that there are many more of these cases than have been recorded. Moreover, there has been a confusion of ideas about the danger of its spread. In one locality the disease is reported to be slowly spreading, and each year there are noted fresh foci of the disease, while, on the other hand, the reported isolated cases are a subject of discussion as to whether they are a menace.

So far there has been no systematic inquiry made with regard to the origin and prevalence of the disease in the United States. Some valuable reports have been made of the prevalence and behavior of this disease in one or two localities. Further than this the information is imperfect and fragmentary.

That the disease is contagious no one at present will deny. The International Leprosy Conference, which met in Berlin in October last, declared that the disease is not only contagious, but when introduced into a country the history shows that it invariably spreads, each case forming a nidus of infection, and sooner or later other cases followed. This fact has been recognized by a few of the State and local authorities where there were a considerable number of cases, and restrictive measures are now enforced to prevent its further spread. In many places from which isolated cases have been reported no such measures have been generally practiced. The Marine-Hospital Service has been notified of the existence of such cases and has been requested to assume charge of them, and when it was ascertained that there was no law for such procedure these cases have been turned adrift to go wherever they pleased.

In this connection I would state that it is believed that there are many more cases of leprosy in the United States than are actually known. Recent investigation and study of the disease has demonstrated that there are quite a number of obscure forms of nervous and skin diseases which were heretofore considered as separate and distinct that are nothing more or less than leprosy.

Before any rational measures can be undertaken by the National Government, if such a conclusion is justifiable, it will be necessary to inquire further into the origin and prevalence of the disease, and to determine just how far it is a menace to our people.

The expenses of such an inquiry would be small; a sum sufficient to meet the expenses of travel of the officers detailed to this duty would be all that is required. This could be properly paid from the fund for the prevention of epidemic diseases.

The bill meets with approval, and I would respectfully recommend that favorable action be taken thereon.

Respectfully, yours,

WALTER WYMAN,

Supervising Surgeon-General Marine-Hospital Service.

Approved:

L. J. GAGE, *Secretary.*

Your committee recommend the passage of the bill.

A BILL for the investigation of leprosy.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That the Supervising Surgeon-General of the Marine-Hospital Service, under the direction of the Secretary of the Treasury, shall appoint a commission of medical officers of the Marine-Hospital Service to investigate the origin and prevalence of leprosy in the United States, and to report on or before December first next, what action is necessary for the prevention of the spread of this disease; the expenses of this investigation to be paid from the fund for preventing the spread of epidemic diseases.

[House of Representatives. Report No. 1215, Fifty-fifth Congress, second session.]

INVESTIGATION OF LEPROSY.

The Committee on Interstate and Foreign Commerce, to whom was referred the bill (H. R. 5431) for the investigation of leprosy, have carefully considered the same.

The importance of the proposed legislation is shown by communications from the Supervising Surgeon-General of the Marine-Hospital Service. On January 13, 1898, in a communication with reference to the proposed measure, he stated:

"With regard to authorizing the Surgeon-General of the Marine-Hospital Service to cause an investigation to be made relative to the origin and prevalence of leprosy in the United States, I have to state that in view of the fact that leprosy is known to exist in quite a number of places in this country there is a prevailing opinion among the sanitary authorities that there are many more of these cases than have been recorded. Moreover, there has been a confusion of ideas about the danger of its spread. In one locality the disease is reported to be slowly spreading, and each year there are noted fresh foci of the disease, while, on the other hand, the reported isolated cases are a subject of discussion as to whether they are a menace.

"So far there has been no systematic inquiry made with regard to the origin and prevalence of the disease in the United States. Some valuable reports have been made of the prevalence and behavior of this disease in one or two localities. Further than this the information is imperfect and fragmentary.

"That the disease is contagious no one at present will deny. The International Leprosy Conference, which met in Berlin in October last, declared that the disease is not only contagious, but when introduced into a country the history shows that it invariably spreads, each case forming a nidus of infection, and sooner or later other cases followed. This fact has been recognized by a few of the State and local authorities where there have been a considerable number of cases, and restrictive measures are now enforced to prevent its further spread. In many places from which isolated cases have been reported no such measures have been generally practiced. The Marine-Hospital Service has been notified of the existence of such cases and has been requested to assume charge of them, and when it was ascertained that there was no law for such procedure these cases have been turned adrift to go wherever they pleased.

"In this connection I would state that it is believed that there are many more cases of leprosy in the United States than are actually known. Recent investigation and study of the disease have demonstrated that there are quite a number of obscure forms of nervous and skin diseases heretofore considered as separate and distinct which are nothing more or less than leprosy.

"Before any rational measures can be undertaken by the National Government, if such a conclusion is justifiable, it will be necessary to inquire further into the origin and prevalence of the disease, and to determine just how far it is a menace to our people.

"The expenses of such an inquiry would be small; a sum sufficient to meet the expenses of travel of the officers detailed to this duty would be all that is required. This could be properly paid from the fund for the prevention of epidemic diseases.

"The bill meets with approval, and I would respectfully recommend that favorable action be taken thereon."

The Surgeon-General further states, in a communication on April 16, 1898, as follows:

"It would be impossible to determine accurately the number of cases of leprosy in the United States, unless it be by a systematic and thorough investigation. From reports received from health officers and other sources, it is known to exist in the States of Washington, California, Texas, Louisiana, Florida, South Carolina, Minnesota, the Dakotas, New York, Pennsylvania, and Illinois. The reports concerning the prevalence of this disease in the above-mentioned States are fragmentary at the best. No accurate information is on file in any of the departments with regard to the exact number of cases in the United States.

"It is believed that if a careful investigation were undertaken many more cases would be found than are supposed to exist. It is believed that the investigation can not be completed before December 1 next, as many parts of the United States have to be visited by the officers detailed for this purpose, and can not be done by obtaining reports from the health officers of the several States or municipalities."

Your committee recommend an amendment by striking out the word "upon," in line 7, and inserting "on or before December first next," and with this amendment recommend that the bill do pass.

NATIONAL QUARANTINE ADMINISTRATION (FOREIGN).

FOREIGN SANITARY INSPECTION SERVICE.

Sanitary inspectors were maintained a portion of the year at Habana and Santiago, in Cuba; at Kingston, Jamaica, at Honolulu, Hawaiian Islands, and on the Mexican border: and throughout the whole year at Yokohama, Japan, and at Rio, Brazil.

I have to invite your attention to the necessity of providing inspectors in the ports of Cuba and Porto Rico during the coming season. Already, with your approval, the disinfecting barge *Protector*, which has been constructed for the Tortugas quarantine, has been especially equipped for service temporarily in the harbor of Habana for the purpose of insuring freedom from yellow-fever infection, as well as smallpox, of vessels, merchandise, and persons leaving that port for the United States during the coming summer, when, without doubt commerce and travel will be greatly increased. Plans are being prepared for a special disinfecting barge for this port. Similar measures will be necessary at Santiago. Furthermore, on account of the increasing fruit trade between the United States and ports in Cuba and Central and South America, it will be necessary to station special inspectors at several of these ports to give certificate to each fruit vessel that the port is safe so far as yellow fever is concerned, in order that their perishable cargoes may not be detained at quarantine in the United States. The expense of these measures is chargeable to the epidemic fund.

SANITARY INSPECTION AT HABANA.

During the year two sanitary inspectors were on duty at Habana, Cuba, and remained there until the declaration of war with Spain made their recall imperative.

Upon the suspension of hostilities they were returned and resumed their duties, arriving there about September 24, 1898, after an absence of five months. The reports of the chief sanitary inspector at Habana have been transmitted weekly and are published in the public health reports issued by this Service.

The special reports of Sanitary Inspector Brunner, giving in detail a sanitary description of Habana and its harbor, and the mortality of yellow fever and smallpox both in the Spanish army and among civilians, were of especial value to the Government.

On account of the widespread prevalence of smallpox in Habana, strict enforcement of the regulations regarding vaccination was enjoined upon the sanitary inspector. The Treasury regulations,

however, do not require at the port of departure the vaccination of all cabin passengers; safety with regard to these is provided for by regulations to be observed at the port of arrival and by general oversight at the port of departure. All steerage passengers, however, from an infected port are required to be vaccinated. Certain State regulations, however, do require vaccination of cabin passengers, and their enforcement is expected at Habana, in aid of their regulations.

Some complaint having been made concerning their enforcement, the following letter was addressed to Sanitary Inspector Brunner, with a view to making plain to all that this requirement was one imposed by State authorities having control of the local quarantine in their respective States.

CONCERNING VACCINATION AT HABANA.

WASHINGTON, D. C., *January 19, 1898.*

SIR: I have to acknowledge receipt of your letter of January 7, 1898, reporting "another appeal case to the consul-general on account of vaccination in the person of a Mr. Gibson, who came to Habana about ten days ago and was not vaccinated until yesterday, when he was vaccinated because he could not show any mark of successful vaccination."

In reply I have to say that there is no regulation of the Treasury Department requiring certification of vaccination of cabin passengers. This requirement, so far as the Bureau is informed, is at the request of the health officer at New York and the State health officer of Florida, and you are requested to transmit to the Bureau copies of any instructions that may be on file in your office covering this question. In order that there may be no conflict between your office and the United States consul-general, you are hereby directed to have printed and conspicuously posted the following paragraph, taken from the quarantine laws of the State of New York, with the following headings:

[Extract from quarantine laws of the State of New York.]

NOTICE TO PASSENGERS BOUND FOR NEW YORK.

SEC. 103. Vessels that touch at other ports on the passage shall bring a bill of health from each and every port, or shall have indorsed upon the original bill of health by the consul, vice-consul, consular officer, or medical officer of the consulate the facts and conditions of those ports as to the existence and prevalence of the infectious and contagious diseases mentioned in this section. All persons coming from or through any port or place, who, after the passage of this act, may arrive at the port of New York, shall be liable to an examination by the health officer, or his deputies, as regards their protection from smallpox. In any case any person so arriving who shall refuse to submit to such examination, or upon such examination shall be found not sufficiently protected from smallpox, or refuses to be protected by vaccination, such person, and in case such person be a minor, then also the person having him or her under charge, shall be detained in quarantine until he or she shall have passed the incubative period from date of last possible exposure; and the expense of such detention shall be chargeable by the commissioners of quarantine upon the consignees or owners of the vessel having such person on board, and such expense as may be incurred shall be a lien upon such vessel. The master of a vessel who shall refuse or neglect to comply with the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than one hundred dollars nor more than five hundred dollars.

You will also have printed and posted in similar manner the following paragraph, taken from the quarantine laws of the State of Florida, with the following heading:

[Extract from quarantine laws of the State of Florida.]

NOTICE TO PASSENGERS BOUND FOR FLORIDA.

SEC. 87. Persons who arrive on vessels coming from any port or place where smallpox is prevailing in an epidemic form, or having had smallpox on board,

must be vaccinated, or show satisfactory evidence of recent vaccination, or of having had smallpox, or be detained in quarantine not less than fourteen days, and all effects and compartments liable to convey infection disinfected.

You will take special care to notify all cabin passengers bound to either of the ports above mentioned that if they are not vaccinated by you, or have no proper vaccination mark, or show they have suffered an attack of smallpox, if they proceed on vessels bound to the ports of New York or Florida without the protection afforded by the Marine-Hospital Service, it is at the risk of being refused passage by the steamer or of undergoing detention upon their arrival at said ports, as shown by the above-printed notices.

Your action in the matter of furnishing to cabin passengers personal certificates of vaccination or immunity should be limited to either furnishing the same or declining to do so, when under the circumstances you are obliged to decline said certificate. It is for the quarantine officer at the port of arrival to determine, then, whether the passenger should be admitted.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General, M. H. S.

Sanitary Inspector W. F. BRUNXER,

United States Marine-Hospital Service, Havana, Cuba.

SANITARY INSPECTOR AT SANTIAGO.

The sanitary inspector at Santiago, as soon as war was imminent, was ordered to Jamaica, where, attached to the United States consulate, he rendered valuable sanitary service.

After the capture of Santiago he was returned to that port and directed to report to the military governor, and for a while was detailed by the latter as health officer, in addition to his duties as inspector of vessels. His reports, written daily, were published in the public health reports, and he is still serving as sanitary inspector at Santiago.

THE INSPECTION SERVICE AT RIO.

During the year the Bureau was deprived of the valuable services of Dr. Reuben Cleary, sanitary inspector at Rio de Janeiro, by his demise, and Dr. W. W. Havelburg was appointed to succeed him.

Three hundred and twenty-eight vessels bound for the United States were inspected, together with their crews. Of this number 159 were British, 43 American, 48 Norwegian, 27 German, 16 Belgian, 13 Portuguese, 7 French, 6 Italian, 6 Russian, and 3 Swedish.

With regard to the prevalence of yellow fever among crews of vessels lying in the harbor of Rio, sanitary inspector Havelburg reports as follows, under date of March 30, 1898:

Yellow fever is looked upon as a sickness which affects shipping and the localities near the seaboard. In Rio de Janeiro yellow fever has been known as endemic since the season of 1849-50. It is always interesting to know to what extent the sickness has increased on shore and in the port. I have obtained some information on this point, and I can report the following:

All sickness on board the ships is brought to the knowledge of the authorities, and eventually the sick persons are sent to the Hospital Maritimo de Santa Izabel; therefore the numbers are very exact.

Cases and deaths from yellow fever on vessels in port, also deaths on shore, from October, 1897, to March 25, 1898, inclusive.

Month.	Vessels in port.		Deaths on shore.
	Cases.	Deaths.	
1897.			
During the month of—			
October	0	0	0
November	0	0	1
December	0	0	3
1898.			
During the month of January	3	0	17
From—			
February 1-11	0	1	15
February 12-18	2	1	25
February 19-25	2	2	37
February 26 to March 4	3	1	42
March 5-11	1	1	44
March 12-18	5	2	62
March 19-25	4	1	68
Total.....	20	9	314

In addition to the inspection of vessels the sanitary inspector at Rio furnishes regular weekly reports of the sanitary condition of the city and of the Republic of Brazil, and on other subjects of general sanitary interest. His reports may be found in the public health reports published by this Bureau, and particular reference is made to a full report on the health of Rio de Janeiro for the year 1897, Volume XIII, July 15, 1898.

REPORTS OF SANITARY INSPECTOR AT YOKOHAMA, JAPAN.

The sanitary inspection of vessels, passengers, and crews bound for ports of the United States has been continued throughout the year, Dr. Stuart Eldridge being the officer in charge of such work.

In addition to the inspection of vessels, he transmits to the Bureau such sanitary information and reports of health and sickness in the Japanese Empire as he is able to obtain. The reports of mortality from infectious disease form a most important addition to the mortality statistics of this office, and are published as received, in the public health reports:

In regard to the inspection service, it appears from the reports submitted that during the fiscal year 1898 146 vessels bound for United States ports were inspected, of which 87 were under the British flag; 27 were American, 16 Japanese, 6 German, 5 Hawaiian, 4 Norwegian, and 1 Danish. Seventy-five of these vessels carried steerage passengers (see detailed statements concerning these vessels and passengers) to the total number of 18,124, and if to this number be added the totals of the crews of the 146 vessels inspected, there will be a grand total of 27,928 persons—steerage passengers and crew—examined at Yokohama before embarkation at that port for the United States.

VESSELS AND PASSENGERS INSPECTED AT YOKOHAMA, BEFORE EMBARKATION FOR THE UNITED STATES, DURING THE TWELVE MONTHS ENDING JULY 1, 1898.

YOKOHAMA, *February 16, 1898.*

SIR: I have the honor to report that during the half year ending December 31, 1897, I have officially inspected 77 vessels bound for United States ports, or an average of a little more than one every two and one-half days. Of these ships, 50

were under the British flag, 15 were American, 7 Japanese, 3 Hawaiian, and 2 German.

Of the 77 vessels inspected, 36 carried steerage passengers, concerning whom I inclose a detailed statement. It will be noted in this that the total number of passengers inspected was 6,938, as against 9,123 for the corresponding period of 1896. This decline in number is, I think, in greater part due to the suspension of emigration of the Chinese to Hawaii since the question of the annexation of the islands to the United States became imminent, as the loss is chiefly in the total of passengers in transit through Yokohama for way ports.

The aggregate of crews inspected during the six months, July 1 to December 31, 1897, was 5,014, making a total of 11,952 persons examined.

I am, sir, very respectfully, your obedient servant,

STUART ELDRIDGE, M. D.,

Sanitary Inspector, U. S. M. H. S.

SUPERVISING SURGEON-GENERAL,

United States Marine-Hospital Service.

Steerage passengers carried on ships bound for United States ports, through and from Yokohama, Japan, and individually inspected, from July 1, 1897, to December 31, 1897.

Name of steamship.	Date of departure.	Destination in United States.	Line.	In transit—		From Yokohama—		Total.	Landed at Yokohama.
				To United States.	Way.	To United States.	Way.		
China	July 8	San Francisco via Honolulu.	P. M.	270	288	36	5	599	14
Olympia	July 17	Tacoma via Victoria.	N. P.	132	51	18	13	214	1
Belgie	July 17	San Francisco via Honolulu.	O. and O.	134	107	11	4	276	26
Peru	July 27	San Francisco	P. M.	75	—	18	—	93	18
Yamaguchi Maru	July 28	Seattle	N. Y. K.	7	—	7	—	14	26
Coptic	Aug. 5	San Francisco via Honolulu.	O. and O.	171	80	36	2	289	20
Columbia	Aug. 11	Tacoma via Victoria.	N. P.	38	22	8	52	120	5
Monmouthshire	Aug. 25	Portland	O. S. N.	20	—	—	—	20	—
Gaelic	Aug. 25	San Francisco via Honolulu.	O. and O.	324	28	42	303	697	15
Kagoshima Maru	Aug. 25	Seattle	N. Y. K.	10	—	4	14	53	—
Tacoma	Aug. 28	Tacoma via Victoria.	N. P.	60	14	3	3	80	—
Peking	Sept. 4	San Francisco via Honolulu.	P. M.	98	289	20	3	410	2
Doric	Sept. 14	do	O. and O.	135	492	11	—	638	17
Tacoma	Sept. 19	Tacoma via Victoria.	N. P.	81	34	15	8	138	3
Kinshiu Maru	Sept. 23	Seattle	N. Y. K.	3	—	7	—	10	6
China	Sept. 23	San Francisco via Honolulu.	P. M.	219	28	19	—	266	22
Belgie	Oct. 3	do	O. and O.	157	92	16	222	487	23
Braemar	Oct. 5	Portland	O. S. N.	12	—	—	—	12	2
Olympia	Oct. 9	Tacoma via Victoria.	N. P.	30	14	4	1	49	—
Riojun Maru	Oct. 9	Seattle	N. Y. K.	—	—	1	—	1	—
Peru	Oct. 12	San Francisco via Honolulu.	P. M.	107	54	8	—	169	21
Coptic	Oct. 21	do	O. and O.	200	24	17	102	343	24
Mogul	Oct. 24	Portland	O. S. N.	20	—	2	—	22	—
Rio de Janeiro	Oct. 30	San Francisco via Honolulu.	P. M.	31	124	10	345	510	12
Columbia	Nov. 2	Tacoma via Victoria.	N. P.	26	4	28	2	60	3
Gaelic	Nov. 10	San Francisco via Honolulu.	O. and O.	207	69	30	15	321	29
Kagoshima Maru	Nov. 19	Seattle	N. Y. K.	—	—	14	—	14	1
Peking	Nov. 20	San Francisco	P. M.	87	—	25	—	113	13
Tacoma	Nov. 22	Tacoma via Victoria.	N. P.	18	10	13	14	55	—
Doric	Nov. 30	San Francisco via Honolulu.	O. and O.	95	61	14	6	176	12
China	Dec. 9	do	P. M.	144	27	14	3	188	29
Victoria	Dec. 14	Tacoma via Victoria.	N. P.	20	22	20	8	70	8
Belgie	Dec. 18	San Francisco	O. and O.	78	—	12	—	90	9
Matsuyama Maru	Dec. 19	Seattle	N. Y. K.	—	—	9	—	9	—
Olympia	Dec. 27	Portland	O. S. N.	—	—	3	—	3	—
Peru	Dec. 29	San Francisco via Honolulu.	P. M.	62	19	30	271	382	88
Total				3,091	1,953	526	1,382	6,938	433

YOKOHAMA, JAPAN, *July 7, 1898.*

SIR: I have the honor to report that during the half year ended June 30 last I have officially inspected 69 vessels bound for ports of the United States, or an average of 1 every two and one-half days.

Of these ships 12 were under the United States flag, 37 were British, 9 Japanese, 4 German, 4 Norwegian, 2 Hawaiian, and 1 Danish; with crews aggregating 4,790.

Thirty-nine steamers carried steerage passengers, concerning whom I inclose a detailed statement, to the number of 11,186, as against 6,938 during the immediately preceding half year, and 9,429 in the corresponding period of 1897, showing a decided increase in the amount of steerage travel through and from this port.

The number of steerage passengers, added to that of the crews of all vessels inspected, gives a total of 16,076 persons individually examined during the six months.

I am, sir, very respectfully, your obedient servant,

STUART ELDRIDGE, M. D.,

Sanitary Inspector, U. S. M. H. S.

Steerage passengers carried on ships bound for United States ports, through and from Yokohama, Japan, and individually inspected, from January 1, 1898, to June 30, 1898.

Name of steamship.	Date of departure.	Destination in United States.	In transit—		From Yokohama—		Total.	Landed at Yokohama.
			To United States.	Way.	To United States.	Way.		
Braemar	Jan. 7	Tacoma via Victoria.	14	29	24	4	71	3
Coptic	Jan. 8	San Francisco via Honolulu.	67	41	17	32	157	25
Rijun Maru	Jan. 12	Seattle via Honolulu.	6	497	2	8	513	31
Mogul	Jan. 15	Portland via Honolulu.	16	445	12	-----	473	-----
Rio de Janeiro	Jan. 18	San Francisco	34	-----	9	-----	43	34
Columbia	Jan. 22	Tacoma via Victoria.	7	55	4	15	81	2
Gaelic	Jan. 27	San Francisco via Honolulu.	31	4	6	115	156	14
Peking	Feb. 5	do	23	7	39	3	72	11
Tacoma	Feb. 12	Tacoma via Victoria.	7	54	23	10	94	4
Doric	Feb. 15	San Francisco	38	-----	46	-----	84	23
Argyll	Feb. 22	Portland	-----	-----	52	-----	52	-----
China	Feb. 24	San Francisco via Honolulu.	87	4	47	667	805	11
Kagoshima Maru	Feb. 26	Seattle	-----	-----	9	-----	9	-----
Victoria	Mar. 5	Tacoma via Victoria.	33	77	52	38	200	-----
Belgie	Mar. 5	San Francisco via Honolulu.	141	161	31	103	436	22
Peru	Mar. 15	San Francisco	102	-----	74	-----	176	25
Olympia	Mar. 21	Tacoma via Victoria.	52	9	94	148	303	5
Braemar	Mar. 29	Portland via Honolulu.	69	560	36	16	681	-----
Rio de Janeiro	Apr. 2	San Francisco via Honolulu.	225	79	19	379	722	15
Yamaguchi Maru	Apr. 2	Seattle via Kobe	-----	-----	14	-----	14	-----
Gaelic	Apr. 12	San Francisco via Honolulu.	586	23	10	204	823	30
Mogul	Apr. 12	Portland via Honolulu.	20	323	1	318	662	-----
Columbia	Apr. 16	Tacoma via Victoria.	49	61	2	64	176	-----
Peking	Apr. 20	San Francisco via Honolulu.	109	55	14	126	304	34
Tacoma	Apr. 30	Tacoma via Victoria.	-----	50	9	28	87	2
Doric	Apr. 30	San Francisco via Honolulu.	259	202	3	25	489	50
Rijun Maru	May 7	Seattle via Kobe	-----	-----	12	85	97	-----
Argyll	May 11	Portland via Honolulu.	12	252	3	26	293	-----
China	May 11	San Francisco via Honolulu.	490	53	20	17	580	21
Belgie	May 21	do	430	140	32	4	406	36
Victoria	May 22	Tacoma via Victoria.	76	101	3	8	188	5
Kinshiu Maru	June 1	Seattle	-----	-----	24	-----	24	3
Olympia	June 3	Tacoma via Victoria.	13	68	5	28	114	3
Peru	June 7	San Francisco via Honolulu.	167	103	6	-----	276	13
Coptic	June 9	do	233	44	19	6	302	44
Braemar	June 18	Portland	128	-----	-----	-----	128	-----
Rio de Janeiro	June 18	San Francisco via Honolulu.	172	54	15	135	376	6
Gaelic	June 28	do	270	158	16	148	592	22
Yamaguchi Maru	June 29	Seattle	1	-----	36	-----	37	17
Total			3,857	3,709	840	2,780	11,186	511

REPORT OF OCCURRENCE OF EPIDEMIC DYSENTERY IN JAPAN DURING THE YEAR 1897.

Sanitary Inspector Eldridge transmits the following table of cases and deaths from epidemic dysentery during the calendar year 1897. There were in all 47 districts infected:

Locality.	Dysentery.		Locality.	Dysentery.	
	Cases.	Deaths.		Cases.	Deaths.
Kioto Fu	832	211	Nagano Ken	5,316	1,234
Osaka Fu	1,141	181	Nagasaki Ken	569	105
Tokyo Fu	7,029	1,248	Nara Ken	148	44
Aichi Ken	2,588	574	Niigata Ken	7,580	1,794
Akita Ken	73	17	Oita Ken	587	144
Awamori Ken	1,490	248	Okayama Ken	1,522	485
Chiba Ken	3,148	847	Okinawa Ken	4	—
Fukui Ken	513	210	Saga Ken	131	50
Fukuoka Ken	926	165	Saitama Ken	1,492	1,298
Fukushima Ken	534	83	Shidzuoka Ken	6,430	1,744
Gifu Ken	1,207	333	Shiga Ken	496	140
Gunma Ken	5,717	1,266	Shimane Ken	1,642	517
Hioo Ken	670	163	Tochigi Ken	1,349	350
Hiroshima Ken	1,878	678	Tokushima Ken	862	274
Ibaraki Ken	1,286	367	Tottori Ken	845	206
Isikawa Ken	247	84	Toyama Ken	70	32
Iwate Ken	1,136	242	Wakayama Ken	364	80
Kagawa Ken	1,959	655	Yamagata Ken	191	56
Kagoshima Ken	1,189	242	Yamaguchi Ken	1,609	435
Kanagawa Ken	6,377	1,365	Yamanashi Ken	9,549	2,071
Kochi Ken	526	105	Yehime Ken	2,017	463
Kumamoto Ken	1,349	236	The Hokkaido	33	14
Miyagi Ken	1,062	286	Taiwan (Formosa)	(a)	—
Miyazaki Ken	593	93			
Miye Ken	770	180	Total	89,846	22,520

a No report.

During the year 1898 there have been to date of August 16, 10,992 cases of dysentery reported, with 1,966 deaths, making in all a grand total of 100,838 cases and 24,216 deaths from dysentery during the nineteen months ending August 16, 1898.

SANITARY INSPECTION AT HONOLULU.

As shown by the following correspondence, Surg. D. A. Carmichael has been detailed for service at Honolulu for the sanitary inspection of vessels, to make report upon the establishment of a marine-hospital relief station as soon as Hawaii shall have been given a Territorial form of government, and to make a complete report on leprosy in the Hawaiian Islands.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,

Washington, D. C., August 4, 1898.

SIR: I have the honor to request the detail, under provision of section 2 of "An act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service, approved February 15, 1893," of Surg. D. A. Carmichael of this Service to serve in the office of the United States consul at Honolulu, Hawaiian Islands.

This detail is necessary owing to the prevalence of epidemic disease in the far East and the increased communication between eastern ports, Honolulu, and the ports of the United States occasioned by the transport of troops.

In connection with the ordinary duties of a sanitary inspector in the issuance of bills of health to vessels bound for ports in the United States, it is intended

that Dr. Carmichael shall investigate and make a report on leprosy, the prevalence of which in the Hawaiian Islands is a matter of common knowledge, and the management of which is now engaging the attention of a large part of the medical world; this with a view to the adoption of measures to prevent the introduction of leprosy into the United States from the Hawaiian Islands.

The expense involved in carrying out this recommendation is chargeable to the appropriation for preventing the spread of epidemic diseases.

Respectfully, yours,

WALTER WYMAN,

Supervising Surgeon-General M. H. S.

THE SECRETARY OF THE TREASURY.

Approved:

L. J. GAGE.

Approved:

WILLIAM MCKINLEY.

TREASURY DEPARTMENT,

OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,

Washington, D. C., August 15, 1898.

SIR: Referring to Bureau letter of the 11th instant, inclosing a copy of the approval of the President of your detail to serve in the office of the United States consul at Honolulu, you are informed that, in addition to the examination of vessels, their crews, passengers, and cargo, and the issuance of bills of health, you will be expected to investigate the subject of leprosy and report upon its prevalence and distribution in the Hawaiian Islands, the measures taken for the prevention of its spread, and make recommendations as to the precautions to be observed to prevent its introduction from said islands into the United States.

You are also directed to make a report relative to the American shipping and the necessity for the establishment of a relief station at Honolulu or other ports in the Hawaiian Islands; and you are authorized, if necessary to the proper execution of these orders, to visit other ports in the Hawaiian Islands. * * *

I transmit, under separate cover, for your guidance as sanitary inspector at Honolulu a copy of the quarantine laws and regulations of the United States, together with the amendatory circulars, and a supply of blank forms for your regular reports from Honolulu. In addition to the routine reports, you are directed to make a written report three or four times each month of any facts or occurrences relating to the islands which would likely prove of interest to the Bureau.

Respectfully, yours,

WALTER WYMAN,

Supervising Surgeon-General M. H. S.

Surg. D. A. CARMICHAEL,

United States Marine-Hospital Service, Cleveland, Ohio.

PRELIMINARY REPORT OF SURGEON CARMICHAEL.

CONSULATE GENERAL OF THE UNITED STATES,

Honolulu, Hawaii, October 12, 1898.

SIR: I have the honor to report that since my arrival on the 1st instant, I have inaugurated an inspection service of all vessels leaving and calling here bound for ports in the United States. An original or supplemental bill of health is issued in each case after inspection of the vessel, cargo, passengers, and crew.

All vessels arriving at Honolulu are inspected by the port quarantine officer,

who is an official of the Hawaiian Government and appointed by the President of the Republic of Hawaii.

There are eight principal islands in the group known as the Hawaiian Islands, viz: Hawaii, Maui, Oahu, Kauai, Molokai, Lanai, Kahoolawe, and Nuhau.

The most important harbors in the group are Honolulu, a city of about 30,000 inhabitants on the island of Oahu, and Hilo, a town of 10,000 inhabitants on the island of Hawaii. There are a number of smaller ports on the different islands, which maintain an interisland commerce, but are not important as far as foreign shipping is concerned. Honolulu is said to rank first of any port in the amount of American tonnage admitted as contrasted with ports in Europe, Asia, and Australia.

Nearly all trans-Pacific vessels carrying passengers make Honolulu a port of call, and the traffic of this class is constantly increasing. Should a canal be completed across the Isthmus of Panama, Honolulu would become a very important station.

All public health matters in the Hawaiian Islands are controlled by a board of health appointed by the Government, and its headquarters are located in the city of Honolulu. This board is composed of three physicians, three laymen, and the attorney-general, who is ex officio president of the board. It has jurisdiction over all of the islands in the group in regard to sanitary matters, the establishment of hospitals, treatment and isolation of leprosy, and the execution of quarantine.

The quarantine establishment is located on Manliola Island, at the entrance to the harbor, and distant from the city docks about 1 mile. The island, slightly raised above high water, is composed of a soft coral formation, and is about 30 acres in area. It is leased from private parties by the Hawaiian Government, and they have erected thereon 22 buildings, comprising detention barracks for steerage passengers and immigrants, disinfecting house (containing a steam chamber and sulphur furnace), electric-light plant, hospitals for contagious and noncontagious diseases, quarters for cabin passengers, attendants' quarters, bath houses, water-closets, etc. It has a good supply of fresh water, conveyed in pipes from Honolulu, and there is a tramway about three-fourths of a mile long running from the station to the harbor entrance. A track is laid on this tramway, and the baggage of those held in detention, and supplies of various kinds are conveyed to the station by means of cars which run along it. A large number of Chinese and Japanese laborers are held in detention and passed through here each year for work on the sugar and coffee plantations on the different islands. The station is efficient for handling immigrants and their baggage, and has been in successful operation for a number of years. No provision has been made for the cleansing and disinfection of vessels other than by sulphur fumigation. The boarding is done by open boat outside of the harbor, and in rough weather it is difficult to accomplish.

The Hawaiian Government last year appropriated \$5,000 for a steam launch for boarding purposes, but it has not yet been provided.

Honolulu has a fair water supply, received in catch basins situated at a level above the city, and is also supplied in places by artesian water. It has no sewerage system, and the most of the excreta is disposed of by the cesspool method. Rice fields, banana plantations, taro farms, and market gardens are numerous in the suburbs, and all this cultivation is aided by irrigating ditches, which contain more or less sluggish water.

The vegetation is distinctly tropical, and much labor is expended on the care of grounds and lawns within the city. Vaccination is compulsory. Prompt reports are required, under penalty, of the existence of contagious diseases. Prostitutes are compelled to register, and are inspected at regular intervals by a Government

physician. The cattle on the different islands are examined at regular intervals for tuberculosis and other affections. Affected cattle are destroyed. The distoma hepaticum is found in the livers of cattle here, and the method of procedure is to remove and destroy the viscera affected, and allow the other parts of the carcass to be sold in open market. Milk, butter, and fish are also inspected, and if found unfit for food condemned.

Malarial diseases are found here; bronchial and pulmonary affections exist, but not in great number; typhoid fever is found on this and the other islands, and syphilis and leprosy in their various stages. My inspection duties have prevented more than a superficial examination of the leprosy question, but the manner of dealing with it here may be thus briefly outlined. All suspected cases are reported to the board of health. If justifiable, they are then removed to the receiving station for lepers at Kalihi, where there is a Government physician in charge, who is a practical microscopist and bacteriologist. The cases are studied by him and frequent examinations of portions of the tissues and secretions made. Photographs and a full history of each case are obtained. At stated intervals, once a month or oftener, as required, all of these suspects are examined separately by five physicians appointed by the Government for that purpose, and each records his individual diagnosis in each case. When the diagnoses all agree that the disease is true leprosy, the case is then removed to the leper settlement at Kalaupapa, on the island of Molokai, for life or until recovery or death. I have attended one session of the board of physicians at the receiving station at Kalihi and saw the examination and diagnosis made in eleven cases of undoubted leprosy, which were ordered to be taken to Molokai.

A bacteriological laboratory is maintained at the Kalihi receiving station at the expense of the Hawaiian Government and is under the direction of Dr. L. F. Alvarez. I have asked for permission to visit the leper settlement at Molokai and it has been granted by the board of health. The board intends to visit Molokai about November 1, and I shall accompany them. The distance from Honolulu is about 50 miles and is made by steamer. No one is allowed to visit the leper colony on Molokai without permission of the board of health. I shall deal with the subject more fully after my return from Molokai.

The commerce of Honolulu justifies the establishment of a station here for the relief of sick and disabled American seamen. A substation should also be established at Hilo, on the Island of Hawaii, and possibly at some other points. I have not had time to visit any of the ports on the other islands, but as soon as I can accomplish it I shall report more fully.

If it can be done within existing law, a system of relief for American seamen should be inaugurated in the office of the United States consul-general at this port. I could be furnished with the necessary medicines, dispensing outfit, dressings, and instruments, and temporary arrangements could be made for the care of cases requiring hospital relief. American seamen apply each day at the United States consulate for relief, and I can only give them advice, as I have no outfit to treat them. If such relief can be established it should be done at once, and it would thus serve as the nucleus of a relief station.

As I understand it, the terms of the annexation act provide that all Hawaiian Government lands and property revert to the United States when the act of annexation is completed. Relative to the establishment of a marine hospital here, there is a tract of land on the eastern slope of what is called the punch bowl (an extinct crater in the rear of Honolulu), which is owned by the Hawaiian Government, which would be suitable for the establishment of a marine hospital. The land is high, well drained, and the only difficulty would be the fresh-water supply, and this could be obtained by an artesian well. The United States consul-general, at the suggestion of Senator Morgan, one of the United States commissioners to Hawaii, examined this tract and informed the Senator that it would

be suitable for hospital purposes. The distance from the water front is not more than 2 miles, and there is a good road leading to the tract.

Relative to the establishment of a national quarantine station, there are few sites available on the island of Oahu for such a purpose. The windward or western side of the island is very rough, exposed to frequent storms, coral reefs are numerous, and there are few or no harbors. On the leeward or eastern side there are but two—the harbor of Honolulu and Pearl Harbor. The harbor of Honolulu is small and, beyond the black line drawn on the map transmitted, in shoal water. The only available place for a quarantine station in its vicinity is Manliola Island, at the harbor mouth, now occupied as a quarantine station by the Hawaiian Government. Pearl Harbor, 8 miles distant from Honolulu, contains many places where a quarantine station could be located, well away from the contemplated navy establishment at that point, but this harbor is approached by a bar, which will cost \$100,000 to dredge sufficiently to admit vessels of large size to the harbor. The establishment of a quarantine station there for use in the near future is therefore somewhat doubtful.

It is the opinion of the United States officials here that early action will be taken by Congress relative to the bar at Pearl Harbor and the establishment of a navy station. If vessels of large draft could enter, it would be the best place for the location of a quarantine station, as it is remote from the track of commerce, and has many other advantages, and should receive careful consideration as the point for the location of a permanent quarantine station. If it is the intention of the United States to assume control of all quarantine matters, including the boarding of vessels and handling of immigrants, immediately after the act of annexation is completed, it will be necessary to secure the island of Manliola, on which the quarantine establishment of the Hawaiian Government is located. It is owned by private parties and leased to the present occupants. A boarding tug would also be a necessity where boarding is done at sea.

I transmit herewith a map of the island of Oahu on which I have marked Honolulu Harbor, Pearl Harbor, Pearl Harbor site for quarantine station, Hawaiian Government quarantine station, and site for proposed marine hospital.

Respectfully, yours,

D. A. CARMICHAEL,
Surgeon. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

METHOD OF INSPECTION OF EMIGRANTS AT NAPLES, ITALY.

The following correspondence and report is herewith submitted, describing the method of the inspection of emigrants leaving Naples for the United States. The method in vogue heretofore had been that established by the medical officer of the Marine-Hospital Service detailed for duty in the office of the consul at Naples in 1893, when cholera was epidemic in that city and elsewhere.

The change was made at the instance of the Italian Government and with the recommendation of the United States ambassador and the United States consul-general at Rome, the Italian Government authorizing the use of its buildings in the inspection by the United States officers.

With the reservation made in the letter of the Secretary of the

Treasury, this method of inspection seems to be an improvement on that instituted under emergency in 1893.

CORRESPONDENCE.

EMBASSY OF THE UNITED STATES,

Rome, Italy, February 17, 1898.

SIR: I have the honor to inform you that some time ago, at the request of the United States consul at Naples, I asked, through the foreign office, that the "consular inspection" (using the words quoted) of emigrants for the United States at that port, which heretofore had been usually made in the open air, might henceforth take place in the Government's shed; and also suggested that the consular and the governmental examinations might well be simultaneous. Both arrangements, as was stated by the consul-general at Rome, would conduce greatly to the health and comfort of all concerned. The Italian foreign office promptly granted these requests in a note of which I send you herewith a copy, with translation, but asked, in behalf of their emigration officials, that the examinations of emigrants' luggage should actually be made by the consul, the vice-consul, or the chancellor of the consulate, excluding all other persons; that this practice should be followed not only at Naples, but at Palermo and Genoa, and that the examinations should be not only simultaneous, but upon agreement by the consul and the Government committee.

On their face these requests from the Italian authorities seemed reasonable, and I caused their suggestions to be made known to the United States consuls at Naples, Genoa, and Palermo through the consul-general in Rome. You will note by the replies from these officials, copies of which I inclose, that they raise certain objections to the propositions of the Government's agents. As I have no authority in such a situation, I refer the matter to the State Department for further instructions, having assured the foreign office that their requests would have careful attention. If the wishes of the foreign office are found reasonable in your view, I shall be glad if the arrangements mentioned can be made, because the Italian Government, having granted us a favor in this matter, it seems ungracious not to reciprocate unless there are good reasons for refusing. It may be that the objections urged by the consuls are sufficiently strong; but if not, I think the granting of this request would make negotiations in other, and perhaps more important, directions easier.

I am, sir, your obedient servant,

WILLIAM F. DRAPER.

Hon. JOHN SHERMAN,

Secretary of State, Washington, D. C.

CONSULATE-GENERAL OF THE UNITED STATES,

Rome, Italy, February 24, 1898.

SIR: In the matter of the inspection of emigrants' luggage, the Italian Government having, through our ambassador, General Draper, granted the request made by our consul at Naples, that said examination be in the future made under a shed belonging to the Italian Government instead of as heretofore in the open air, suggested at the same time that such inspection be performed simultaneously with the usual inspection of emigrants made by the officials of the Italian Government.

I referred this suggestion to our respective consuls at Genoa, Naples, and Palermo, who made no serious objections to it, their objections arising mainly from their misunderstanding of the measure.

The matter being now well understood and there being no good reason against, but various ones in favor of, accepting the Italian Government's suggestion, I

have so recommended it to our respective consuls at Genoa, Naples, and Palermo, and I would respectfully suggest your confirmation of my action.

I am, sir, your obedient servant,

Hon. WILLIAM R. DAY.

Assistant Secretary of State, Washington, D. C.

HECTOR DE CASTRO,

Consul-General.

DEPARTMENT OF STATE.

Washington, D. C., April 22, 1898.

SIR: I have the honor, by direction of the Secretary of State, to inclose for your information copies of correspondence with our ambassador and consul-general at Rome and our consul at Naples relative to the consular inspection of emigrants leaving Italian ports for this country.

At present the consul at Naples employs five or six men who make a searching examination of the emigrants as they go on board the ship, taking from them any articles of food which they may have about them, and throwing aside for disinfection any old clothing. The baggage of the emigrants is also opened and inspected by the same men.

This system of inspection, which is also in vogue at other Italian ports, is the one instituted by the Marine-Hospital Service at Naples and other ports during the late cholera epidemic. Its continuance to the present time, while no doubt beneficial in its results, has not been justified by the existing conditions. It has involved the collection of heavy fees from vessels, covering the expenses of the inspection, amounting now to \$40 for each vessel, and formerly to much more. These charges have long been a source of complaint and trouble, and the Department would be glad to avoid the necessity for making them.

As appears from the inclosed correspondence, the Italian Government has instituted an official inspection of emigrants leaving its ports, and desires that the consular examination be made simultaneously with its own, and that the consul himself or someone from his office be the only person present on behalf of the United States.

It is thought that the action of the Italian Government in instituting an examination of its own offers a very good means of doing away with the present unsatisfactory condition of affairs. * * * and if the examination is made in the presence of an officer from the consulate who simply supervises or overlooks it in the interest of our quarantine laws, it is believed that every requirement of our regulations will be satisfactorily observed. This idea is carried out already at several European ports, notably in England, where the local boards of health make a thorough inspection of the ship and steerage passengers, the consul relying upon the same as the basis of his action.

It has therefore been thought advisable to instruct our consular officers in Italy to cooperate with the Italian authorities in this matter, and in that connection the inclosed instruction has been prepared. Before sending the instruction, however, this Department desires to submit the draft to you for your concurrence therein, should you agree with its provisions.

Respectfully, yours,

THOS. W. CRIDLER,

Third Assistant Secretary.

The SECRETARY OF THE TREASURY.

[Inclosure.]

DEPARTMENT OF STATE,

Washington, May 27, 1898.

SIR: Our ambassador at Rome has communicated to this Department a request made by the Italian Government that the consular inspection of emigrants for the

United States be made by the consul of the United States, or someone from his office, excluding every other person, the inspection to be made simultaneously with that conducted by the Italian officers.

The Department is of the opinion that the arrangement will greatly simplify the inspection of emigrants, and will be productive of fully as effective results as the system now in vogue.

It must be understood that in times when there is no epidemic prevailing the method suggested will presumably suffice, but that in the event of an outbreak of an epidemic disease, or in the event of a shipment from Italian ports of emigrants from other countries which may be infected with epidemic disease, a different procedure may become necessary, particularly should circumstances render it necessary for the detailing of a medical officer of the United States to serve in your office pursuant to the act of Congress approved February 15, 1893. (See U. S. Stat. L., vol. 27, p. 450, sec. 2.)

You are therefore instructed to cooperate with the Italian authorities in this matter, after acquainting them with the character of this instruction, discontinuing the present examination and relying on that made by the Italian officials under your observation or the observation of someone from your office.

Respectfully yours,

THOS. W. CRIDLER,
Third Assistant Secretary.

A. H. BYINGTON, Esq.,
Consul of the United States, Naples.

TREASURY DEPARTMENT,
Washington, D. C., May 6, 1898.

SIR: I have to acknowledge receipt of the letter of the Third Assistant Secretary of State of April 22, inclosing copies of correspondence with our ambassador and consul-general at Rome and our consul at Naples relative to the consular inspection of emigrants leaving Italian ports for the United States.

It appears that a request has been received from the Italian Government that the method of consular inspection of emigrants now in vogue be changed in view of the fact that the Italian Government has instituted its own inspection, and that instead of the United States consul, with several assistants, inspecting emigrants, that the United States consul, or the officer of the consulate detailed for that purpose, make the examination in conjunction with the officers of the Italian Government.

I am informed by the Surgeon-General of the Marine-Hospital Service that, after careful consideration of the matter and a careful reading of the correspondence relating thereto, he is of the opinion that in ordinary times—that is, in times when there is no epidemic prevailing—the method suggested will suffice, but that in the event of an outbreak of epidemic disease, or in the event of the shipment from Italian ports of emigrants from other countries which may be infected with epidemic disease, a different procedure may become necessary, particularly should circumstances render it necessary for the detailing of a medical officer of the United States to serve in the office of the consul in accordance with the act of Congress approved February 15, 1893.

I have therefore to suggest that, while complying with the wishes of the Italian Government as indicated in the proposed letter to the United States consul at Naples, the reservation as above suggested be made.

I return herewith the draft of letter inclosed in your communication.

Respectfully, yours,

O. L. SPAULDING, *Acting Secretary.*

The SECRETARY OF STATE.

DEPARTMENT OF STATE.

Washington, October 4, 1898.

SIR: I have the honor to inclose for your information a copy of a dispatch from the consul-general at Rome, Italy, together with a portion of a report transmitted therewith concerning the method of inspecting emigrants at Naples.

I have the honor to be, sir, your obedient servant,

JOHN HAY.

The SECRETARY OF THE TREASURY.

[Inclosure.]

CONSULATE-GENERAL OF THE UNITED STATES,

Rome, Italy, September 3, 1898.

SIR: Referring to my dispatch numbered 21 of the 4th ultimo concerning consular investigation and inspection, in which I reported my proposed departure for Naples to carry out the instructions of your telegram received July 28 last, regarding the posts of Naples, Castellamare, and Sorrento, I now have the honor to say that I left Rome in the evening of August 7 last, reaching Naples in the morning of the 8th following, and that I was engaged at Naples, Castellamare, and Sorrento in the matter in question until the 21st of August last, and returned to the consulate-general on the 22d. following.

Considering it important that you should be informed as speedily as possible as to the results of my service at Naples, I inclose herewith a report of same, which will, I trust, convey all the information desired.

Toward the end of my task at Naples I received your instruction numbered 22 of July 29 last, confirming your telegram mentioned above and directing me to visit the different consulates within the jurisdiction of my office and giving details as to the making of a careful and thorough inspection of each.

To carry out these instructions, I will depart from my post at Rome on the evening of the 4th instant, leaving Vice-Consul-General Wood in charge of the consulate-general.

Upon my return to Rome my report of service at the office of Castellamare and Sorrento will be included with the reports of service at the offices I am about to visit.

I am, sir, your obedient servant,

HECTOR DE CASTRO, *Consul-General.*

Hon. J. B. MOORE,

Assistant Secretary of State, Washington, D. C.

[Inclosure.]

INSPECTION OF EMIGRANTS AT NAPLES.

On the 8th of August, 1898, I arrived at Naples and proceeded to visit the commander of the port, who received me most courteously. He informed me he had received on July 4 last orders from the minister of the navy at Rome to cooperate with the United States consul in regard to the inspection of emigrants, for the benefit of both the Governments of the United States and Italy, and of the emigrants as well. The commander told me that he thought the minister of the navy, through the minister of foreign affairs, would have notified the United States embassy at Rome of the orders imparted to him, and that the embassy would have in its turn in the usual manner notified the consul at Naples, instructing him at the same time to communicate with the port authorities. Not hearing anything in the matter from the consul, he decided to send him the following communication:

[Translation.]

OFFICE OF THE CAPTAIN OF THE PORT,

*Naples, August 2, 1898.*The CONSUL OF THE UNITED STATES, *Naples:*

The minister of the navy informs me that the Government of the United States asked that the inspection of the baggage of emigrants leaving for the United

States be made by the consulate simultaneously and in concert with the sanitary commission of this office. The said ministry has acceded to this request, and has also consented that the consul of the United States delegate a physician of his own choice to be present at these inspections, in cases where emigrants may come from places infected with contagious diseases.

In view of these instructions I beg to state that I am ready to come to an agreement with you as to the best means for performing this service simultaneously with the commissions of this office.

Yours, respectfully,

THE CAPTAIN OF THE PORT.

At this point I wish to say that up to Sunday evening, August 7, day of my departure from Rome, the embassy had received no communication from the foreign office upon the subject. One was, however, received after my return to Rome.

The commander of the port informed me that, in response to his communication to the consul, the vice-consul had called on him and that they had come to an understanding in regard to future examinations of emigrants. The commander sought to show me how important it was for the Italian Government that the examination of emigrants should be made with thoroughness, and that the Government of Italy was as much interested in it as the Government of the United States. He regretted that the new building of the port was not quite ready for use, for it had been provided with all the accommodations and facilities for sheltering and inspecting emigrants, so that the inspections could be made with the least trouble to all concerned. That building is nearly ready. Meanwhile, the shed where inspections were formerly made has been demolished, and the work of inspection has to be done either under an open shed on the quay or on the steamer itself.

The commander of the port assured me of his hearty desire to cooperate with us in every way in this matter. Formerly there had been misunderstandings and irritation owing to the lack of precise orders from the Italian Government. The commander of the port could not, unless ordered to do so, officially recognize foreign commissions appointed by foreign governments for the purpose of inspecting vessels or travelers. Such commissions would be allowed to perform their work informally. In times past there had also been some abuses committed to the detriment of emigrants: for instance, such as the confiscation of their articles of food, but he was glad to say that recently, and since the incumbency of Mr. Byington, our consul, the United States inspectors had been very considerate toward emigrants; there was no complaint to make. He was satisfied, however, that cooperation would give the best results, expediting matters and benefiting both the two Governments and the emigrants.

The commander of the port then referred me to his deputy, who also showed me every courtesy. We then agreed that we would make our first simultaneous inspection of emigrants sailing per the German Lloyd steamer *Werra*, booked to sail from Naples on August 12, with 450 emigrants, and the second for the Anchor Line steamship *Alsatia*, sailing the 15th, with 350 emigrants: the former inspection to take place on the quay and the second on the steamer.

Having made arrangements to perform the inspection of the emigrants sailing by the German Lloyd steamship *Werra*, an officer of the port, Captain Amatruda, was detailed to meet Vice-Consul St. Leger and myself on August 12, in the morning, on the pier along the marine building, corresponding to our barge office, whence the emigrants were to be embarked. As soon as the emigrants arrived their luggage was examined, for the purpose of detecting perishable articles of food which they very often carry among their chattels. When articles of that sort were found in the boxes destined to go into the hold of the ship they were removed, and

unless unwholesome handed back to the owner, who might use them during the voyage. While this inspection was being performed by the men in the service of a contractor, employed by the United States consulate for that purpose, an inspector of the health department was present to remove from the luggage all soiled linen or bedding for disinfection either at the Government disinfecting station or on board the steamer. The disinfecting is done in a steam jacket, to which low-pressure steam first and dry steam next is applied. This disinfection is thorough as far as it goes, but to be really efficient all the belongings with which the soiled linen has been mingled should be treated in like manner. In times of favorable sanitary conditions, like the present, and in the absence of contagious diseases, this partial disinfection is a mere matter of form. It must, however, be continued, lest its abandonment should relax the vigilance of the authorities and of the inspectors.

As the baggage was inspected and labeled and stamped by the examiners, the emigrants themselves were put into barges and taken to the sanitary station, for the purpose of being examined by the physician of the steamer and by the doctor delegated by the health department.

This station is on the pier at the lower end of the port, called the military port. It consists of a building containing a steam disinfecting apparatus, shower bath-rooms, hot and cold, and all necessary accessories for such an establishment. The emigrants were placed on one side of an iron fence and allowed to pass one by one through a gate at which the two physicians stood. The examination is most carefully done and any suspicious case is immediately isolated for observation and reexamination. Those who can not be allowed to embark on account of disease are kept back, their luggage is returned to them, and they may be sent to the hospital if deemed necessary.

As soon as the emigrant has favorably passed the physicians' examination he must undergo another examination, performed this time, however, by the chief of police of the port. This official examines and cross-examines every passenger, scrutinizing carefully their papers, whether they emanate from the local authorities or from foreign governments. No Italian is allowed to leave unless he is in possession of a clean bill of "laisser-passer," consisting of a document delivered by the mayor or prefect of his respective town or district, showing that he or she is free to leave the country, and of a passport. Those emigrants bearing foreign passports must also present a declaration from the authorities of the locality they may be coming from, showing that there is nothing known against them nor any reason to detain them. Those of the emigrants who have successfully passed the various examinations are checked off by the police and by the steamship company's agent and sent aboard, where they receive a check for their respective berths.

The next inspection of outgoing emigrants took place upon the steamer *Alsatia*, of the Anchor Line, sailing on August 17. The inspection began on the 16th; this time also in the presence of a delegate officer from the office of the commander of the port and an inspector of the health department. The luggage was first examined, as previously, and the other inspections followed in the presence of Vice-Consul St. Leger and myself. Everything proceeded smoothly, although in a rather limited space.

The third inspection I witnessed was that of the emigrants, per steamship *Trojan Prince*, sailing from Naples on August 19. The inspection began on the 18th. The *Trojan Prince* had arrived from Palermo, with about 250 steerage passengers for the United States. She was to take an equal number at Naples. These were all sent in barges to the sanitary station with their hand luggage, their big luggage being examined at the pier in front of the barge office. After passing the medical visit, carefully performed by the doctor of the steamship, assisted by the doctor delegated by the health department, and undergoing also the examination of the

police inspector, they were sent in groups on board, where their hand luggage was inspected and labeled.

The fourth inspection I witnessed, only partially, was that on the steamship *Patria*, of the Fabre Line, sailing immediately after the *Trojan Prince*. That inspection was wholly made on board, the lack of space upon the pier at the sanitary station not allowing of the two steamer loads being inspected at one and the same time. On the *Patria* the luggage was examined by employees of the contractor, under the supervision of Vice-Consul, St. Leger, while the sanitary and police inspections were performed by the doctor of the ship, an assistant doctor from the health department, and a police inspector, respectively.

As shown, these four consecutive inspections were all performed by officials in concert with the local authorities. Much time was saved to the inspectors and to the emigrants and there was no irritation and confusion. All possible courtesy was shown to us, and there was an earnest desire manifested on both sides to help one another, and to see that all the regulations, both of our Government and of the Italian Government, should be fully carried out.

In my opinion the cooperation of the Italian authorities with us for the inspection of the emigrants is a great benefit, and will unquestionably bring good results, not only so far as the sanitary question is concerned, but in regard to preventing migration to our ports of undesirable persons and would-be United States citizens.

The absence of a building in which to perform all these inspections at present causes great inconvenience to emigrants as well as to the inspectors and the steamship companies, but this is only temporary, for the new building will be in readiness for use in the next few weeks and greatly facilitate the work. The steamers will land alongside of this building and the emigrants will go on board directly after passing the various required inspections. The building, as previously said, is provided with all the modern improvements: Rooms for inspection of baggage, rooms for medical examination, observation rooms, disinfecting apparatuses; in one word, with everything to make it answer the purposes for which it has been erected. The commander of the port gave me an opportunity to visit it thoroughly.

I should say that the actual commander of the port is a man of great practical sense, energy, and integrity. He is the father of these improvements and a friend of progress. He not only showed me the greatest consideration, but manifested his gratification at the arrangement which would hereafter enable both the American and the Italian commissions to cooperate and to work in concert. This arrangement will be especially valuable in case of the breaking out of any contagious disease, when the greatest care and vigilance must be exercised. Mr. Witting repeatedly expressed the view that it was as much to the interest of the United States as of the Italian Government that the sanitary and moral, as well as the police, examinations of emigrants necessary to a compliance with the laws and regulations of both countries be carried on in the most scrupulous manner, for the reason that every emigrant rejected by the United States entailed an expense upon the Italian Government from the moment he was landed back at the port of departure until his return to his home. Another and immediate benefit resulting from the concerted inspection is the protection of the emigrant against imposition from outsiders with or without the connivance of minor employees. It has happened in the past that the individuals having charge of the inspection of luggage have extorted money from poor travelers under one pretext or another. The consul has been very vigilant in checking this evil. The port officials at Naples recognize that since the consulate has been in charge of Mr. Byington the treatment of emigrants has greatly improved. Whenever an inspection agent has been detected collecting money illicitly he has been discharged on the spot. Under the eye of the representative of the consulate and of the inspectors of the Italian Government such practices would hardly be possible.

For all of these reasons it is advisable that the inspection of emigrants as now arranged be continued by the representative of the United States Government in concert with the Italian authorities at Naples. The commissions acting jointly will be careful to properly perform their respective duties, being under the control of one another.

QUARANTINE STATION, WILLIAM HEAD, BRITISH COLUMBIA.

On account of the proximity of this station to the United States Quarantine Station at Port Townsend, Wash., the rivalry between the Canadian and American lines of steamships, it is essential that practically the same requirements be enforced at each station to prevent undue advantage to the lines of either country, and to prevent the necessity of additional restrictions in either country upon passengers and effects that have passed through the quarantine of the other. With the coincidence, therefore, of the general superintendent of Canadian quarantines, I directed Passed Assistant Surgeon S. D. Brooks to visit the William Head Quarantine in British Columbia and to furnish a description of the station and of the methods in vogue. Following is his report:

REPORT ON THE BRITISH COLUMBIA QUARANTINE STATION AT WILLIAM HEAD, BRITISH COLUMBIA.

By P. A. Surg. S. D. BROOKS.

OFFICE OF MEDICAL OFFICER IN COMMAND, M. H. S..

PORT TOWNSEND QUARANTINE.

Port Townsend, Wash., September 27, 1898.

SIR: I have the honor to report that I have made an inspection of the British Columbia Quarantine at William Head, about 10 miles from Victoria, as directed in Bureau letter of August 23, 1898, and that I witnessed the routine methods used in disinfecting the steamship *Empress of India*, just arrived from Hongkong and way ports.

Over \$100,000 has been expended in bringing the station to its present condition. It has an abundant supply of excellent water, piped to all the buildings from a lake 5 miles distant and 400 feet above tide water, with a small reservoir on a knoll in the reservation to serve for a short time in case of accident to the main.

The structures on the reservation are a fumigating house on the dock, a steam disinfecting and bath house, a hospital, two detention houses for steerage passengers, one for cabin passengers and ships' officers, residence for the superintendent, quarters for attendants, small laundry, etc.

The wharf is a substantial structure, 400 feet long and 40 wide, on pilings sheathed with copper, and is connected with the shore by a walk at either end. This affords a front sufficient for the passenger steamships. On this are sheds for baggage and a room for sulphur fumigation. A small tower supports a 4,000-gallon tank for "bichloride" solution for disinfecting ships. A track runs the length of the dock and connects with the building containing the steam chamber on shore. A sulphur furnace and fan and an engine on two cars are usually located on the dock, convenient for use in disinfecting a ship.

The building, with which one shore end of dock directly connects, contains a jacketed steam chamber, 7½ feet square and 25 long, with entrance and exit in entirely separate rooms and connection between the two rooms only through

boiler room on one side and bathroom on the other. A vacuum pump is connected with the chamber.

The bathrooms consist of twelve apartments, 3 feet square, with a shower overhead and a pipe from ceiling to floor in each of the four corners perforated with many small holes. Each room is lined with galvanized iron. Two of the bathrooms connect with private undressing and separate dressing rooms for women. Large common apartments serve the same purposes for men. Water-closets are conveniently situated in either end of this portion. The tracks for cars run along outside this building and through it and the steam chamber from either end. A 4,000-gallon tank supported above the roof of this building supplies water for the baths, which is heated from the boiler below.

The hospital is at some distance on shore and contains four wards capable of holding 10 beds each, and several small rooms, bringing the total capacity up to 60 beds, besides necessary rooms for kitchen, storerooms, dispensary, bathrooms, and nurses' rooms.

In another location are the two detention houses for steerage passengers. No beds are provided, and it is the custom for the Chinese and Japanese to bring their blankets and mattings from the ships and sleep on the floor. Kitchens, storerooms, and bathrooms are also provided. The floor space is estimated as sufficient for 600 people, and this could be greatly increased by putting in bunks in tiers.

The house for cabin passengers and officers is likewise detached, and is divided into 28 small rooms, each containing two single berths; two bathrooms, a dining room in the center, and kitchen and pantry in the rear.

The disinfection of the steamship *Empress of India*, bringing 268 Asiatic steerage passengers, was conducted as follows:

The baggage, including bedding of the steerage passengers, was sorted over, articles not injured by steam were made into parcels and carried to the steam chamber, while containers and articles injured by steam were put into a room on the dock and into a small steerage compartment on the ship, when pans of sulphur were ignited and the doors sealed. Five or six hours is the utmost of time given to this fumigation, but the superintendent stated that he often sprayed these same articles with "bichloride" solution in addition. The above work of sorting was done partly by the quarantine attendants, partly by the immigrants themselves. The steerage passengers then came ashore to the disinfecting building, removed their clothes, and went into the bath. "Bichloride" solution (1:2,000) is used for the bath. They then filed into another room, rubbed down, and were given a blanket for protection. Meanwhile all their clothing was packed on the cars with the baggage previously sorted out, the cars rolled into the chamber and kept there about an hour, or until a temperature of 212° F. had been maintained for thirty minutes, besides using the vacuum pump to 15 inches, both before and after the above-mentioned thirty minutes. All articles came out dry. The different parcels were then sorted out according to numbered tags given to the immigrants and tied to the parcels.

A mail clerk also sorted over the mails, taking out what was presumably native Chinese correspondence (that is, letters addressed to Chinese individuals), and bags containing these were put into the steam chamber with the baggage. At one time all the mail was so treated, but as there were many samples of tea, and these were injured, the above plan was adopted. In answer to my inquiry, it appears that no complaints of injury to letters have been received. The steam chamber was filled only once for all the work above detailed. During these processes attendants had sprayed the steerage with a solution of "bichloride" from a 1-inch hose.

This routine disinfection is expected to be carried out for the present for all Asiatic immigrants.

In the case of the Northern Pacific steamships, when they touch at Victoria before entering a port of the United States, in addition to the above, the Asiatic crews are also bathed, their effects all disinfected, and their apartments sprayed in the same manner as the steerage. In this way the disinfection is the same as carried out at this port.

The quarantine attendants appeared to carry out their work intelligently and faithfully, and the only weak point, the use of sulphur in the manner described, would always be supplemented by "bichloride" immersion or spraying, in case infectious disease was found on the ship.

The superintendent, Dr. Watt, has been most earnest in putting his station on a proper footing for handling large numbers of immigrants with dispatch, and could now easily care for 1,000 or more in one day, and he is very ready to cooperate with this station in any proposed method of treatment.

In further obedience to your orders, I met the commissioner of immigration in British Columbia and ascertained that he has no jurisdiction over Chinese immigrants (this coming under another bureau), nor over Japanese immigrants for the United States unless they enter British Columbia by the Canadian Pacific ("Empress") steamships. These latter all receive inspection cards, he informs me. I may add further that, in spite of a Department ruling that steamship lines from Asia having a terminal point in the United States must carry all immigrants with through tickets to said port of the United States, Japanese are liable to leave ships of the Northern Pacific Company in Victoria, British Columbia, instead of being landed in Tacoma, Wash. In proof of this I cite the instance of the steamship *Columbia*, arrived yesterday with one Japanese missing, though he came to Victoria. His immigration card was held by me and handed to the collector of customs for investigation. One Japanese was missing from the previous ship of this line, but I could not ascertain positively that he landed in Victoria, as it was claimed he never embarked. Whenever the ships of the Japanese line touch at Victoria, before this port, the same thing is liable to happen. These Japanese can cross into the United States without inspection cards, as they can claim residence in Canada.

Respectfully, yours,

S. D. BROOKS,
Surgeon, U. S. M. H. S.

SURGEON-GENERAL, MARINE-HOSPITAL SERVICE.

NATIONAL QUARANTINE ADMINISTRATION (DOMESTIC).

YELLOW FEVER PRECAUTIONS IN THE SPRING AND SUMMER OF 1898.

The unsettled conditions in Cuba which prevailed at the opening of this calendar year, yellow fever being at that time in Havana and in other localities in the island, and later the grave addition to the danger of importation of that disease from Cuba by reason of the much increased communication after the inception of hostilities with Spain and the transportation of an army to the above-named Spanish province, excited very grave concern lest, in the turmoil and confusion of war, the quarantine regulations might be evaded or at least rendered inoperative.

It is no inconsiderable proof of the efficiency of such regulations that, the season having passed, it is impossible to point to any case of importation of the disease from Cuba where it has spread after such importation.

Officers of the Service were located in different cities along the South Atlantic and Gulf coasts for the purpose of maintaining vigilant watch with regard to the observance on the part of naval vessels and army transports of the quarantine regulations.

SPECIAL REGULATIONS FOR NAVAL WAR VESSELS.

It being evident that in time of war naval war vessels could not be compelled to comply with the ordinary quarantine regulations involving delay, and since every such vessel carries a competent medical officer and the vessels themselves are of iron and carry no merchandise, all on board subject to strict discipline, it was necessary to amend the regulations to meet the conditions of war, and, accordingly, Circular No. 57, March 31, 1898, was issued, permitting such necessary communication with the vessels of the Navy as the certificate of the medical officer would show was not liable to convey infection, and authorizing the acceptance of the certificates of such officers that the quarantine regulations in other respects had been complied with and permitting their entry into the ports of the United States, even if coming from infected fever ports, without the usual quarantine delay and disinfection, provided that no communication liable to infect the vessel or her crew had been held in the yellow fever infected port.

NAVY REQUESTED TO INTERCEPT SMALL CRAFT AND REFUGEES
FROM CUBA.

As early as May, 1898, it was feared that yellow fever might make its way into the Southern States through the medium of refugees and baggage from Cuba on small craft surreptitiously seeking entrance into the United States, and for the prevention of such entrance the following correspondence was held with the Navy Department:

TREASURY DEPARTMENT,
Washington, D. C., May 3, 1898.

SIR: I am informed by the Surgeon-General of the United States Marine-Hospital Service that even under ordinary circumstances there has been danger of the introduction of yellow fever from Cuba into the State of Florida through the medium of small craft containing persons and baggage, seeking, for various reasons, surreptitiously to land upon the Florida coast. Under present conditions, it is believed that the danger from small craft is greatly increased.

During the active quarantine season, from April 1 to November 1, it is contrary to the United States Quarantine Regulations for persons from Cuba not immune to yellow fever to be landed at any point south of the southern boundary of Maryland without detention in quarantine from three to five days, and their baggage must be disinfected. The importance of enforcing these regulations throughout the summer is very great, and I have to request that the officers of the fleet in Florida or Cuban waters be instructed to aid in the prevention of the introduction of yellow fever into the United States by keeping vigilant outlook for small vessels of the character above described, and upon their apprehension such vessels and their personnel be taken immediately, under guard, to the nearest quarantine station for necessary detention and disinfection.

The quarantine disinfecting stations in the South are located as follows:

Mississippi River Quarantine Station, Louisiana; United States (Gulf) Quarantine Station, Ship Island, Mississippi; Mobile Bay Quarantine Station, Alabama; Mullet Key (Tampa) Quarantine Station, Florida; United States (Dry Tortugas) Quarantine Station, Florida; United States (Brunswick) Quarantine Station, Georgia; United States (Sapelo) Quarantine Station, Georgia (or South Atlantic); Savannah Quarantine Station, Georgia; Charleston Quarantine Station, South Carolina; United States (Cape Fear) Quarantine Station, North Carolina; United States (Cape Charles) Quarantine Station, Virginia.

I have the honor to remain, respectfully, yours,

L. J. GAGE, *Secretary.*

The SECRETARY OF THE NAVY.

NAVY DEPARTMENT,
Washington, May 14, 1898.

SIR: I have the honor to acknowledge the receipt of your letter of the 3d instant, asking that the Navy Department, through its officers at the naval station, Key West, cooperate with the officials of the Treasury Department, in aiding in the prevention of the introduction of yellow fever into the United States, and, in reply, have to state that copies of your communication have been sent to the commandant of the United States Naval Station at Key West and to the commander in chief of the North Atlantic Squadron, with instructions to keep a lookout for and apprehend any small vessels which it is believed intend to effect a surreptitious landing on the Florida coast.

Very respectfully,

J. D. LONG, *Secretary.*

The SECRETARY OF THE TREASURY.

NAVY DEPARTMENT TO FORBID TRANSPORTATION OF REFUGEES OR EFFECTS FROM CUBA, AND TO REQUIRE OBSERVANCE OF USUAL QUARANTINE REGULATIONS ON THE PART OF PRIZE VESSELS AND AUXILIARY VESSELS NOT CARRYING MEDICAL OFFICERS.

TREASURY DEPARTMENT,
Washington, D. C., June 8, 1898.

SIR: I have to acknowledge receipt of your letter of May 14 stating that, in reply to the request made in my letter of May 3, the commandant of the United States naval station at Key West and the commander in chief of the North Atlantic Squadron have been furnished with copies of my letter, and have been instructed to keep an outlook and to apprehend any small vessels which it is believed intend to effect a surreptitious landing on the Florida coast.

In addition to this precaution, I have to request that the proper officers of your Department be directed to forbid the transportation from Cuban or other ports liable to be infected with yellow fever, on any of the vessels under the supervision of the naval authorities, of any refugees, also baggage, clothing, merchandise, or other material capable of conveying infection, which is not strictly military or naval in character.

I am informed by the Surgeon-General of the Marine-Hospital Service that there is little apprehension of danger with regard to regular vessels of the Navy, but that unusual care is necessary with regard to prize vessels and auxiliary vessels which do not carry medical officers, and I have to make additional request that through the proper officers orders be given that the quarantine regulations relating to the disinfection of suspected vessels and contents, and detention in quarantine of persons who have been exposed to yellow fever, be strictly complied with. This matter has been placed before Commodore Remey at Key West, who concurs in this recommendation.

I have the honor to remain, respectfully, yours,

L. J. GAGE, *Secretary.*

THE SECRETARY OF THE NAVY.

NAVY DEPARTMENT,
Washington, D. C., June 10, 1898.

SIR: I have the honor to acknowledge the receipt of your letter of the 8th instant, requesting that orders be issued by this Department directing that the transportation of refugees, baggage, clothing, merchandise, or other material capable of conveying infection be forbidden from Cuban or other ports liable to be infected with yellow fever, and that the quarantine regulations relating to the disinfection of suspected vessels, and the detention of persons who may have been exposed to yellow fever, be strictly complied with, and in reply, have to inform you that orders have this day been issued to the commanders in chief and commandants of naval stations to comply with the suggestions contained in your letter.

Very respectfully,

CHAS. H. ALLEN, *Acting Secretary.*

THE SECRETARY OF THE TREASURY.

CORRESPONDENCE WITH THE WAR DEPARTMENT REGARDING TRANSPORTS.

The same danger existed also in the case of transports of the Army, as these vessels plying between the ports of Cuba, which were presumably infected with yellow fever, returned directly to some United States port, where they were reloaded with men and supplies.

Consequently the following correspondence, directed to the prevention of this danger, was had with the War Department:

TREASURY DEPARTMENT,
Washington, D. C., May 31, 1898.

SIR: I have to invite your attention to the precautions deemed necessary by this Department to prevent the introduction of yellow fever from Cuba during the coming summer and fall through vessels engaged in transporting troops and supplies from the ports of New Orleans, Mobile, and Port Tampa. Each summer and fall, even under ordinary conditions, the greatest care is exercised by the national, State, and local quarantine authorities with regard to vessels entering the southern ports of the United States from Cuban and other tropical ports, and it is believed to be practicable to enforce, with regard to these transport vessels, the regular quarantine regulations which, by the act of Congress approved February 15, 1893, it is the duty of this Department to enforce.

I have, therefore, to request that the proper officers of your Department be directed to instruct masters of these transport vessels that they are forbidden to bring refugees from Cuba on their return to ports within the United States, and are also absolutely forbidden to bring any bundles of clothing, baggage, or other merchandise capable of conveying infection which is not strictly military in character. This provision will not only serve to protect the ports of the United States from yellow fever infection, but will also tend to prevent the infection of the transports themselves, which, if infected, might convey the disease to the troops en route to Cuba, and it is supposed these transports will each make a number of trips back and forth.

I have further to request that an order be issued requiring the masters of these transport vessels to submit to the regular quarantine examination and necessary restraints on arriving at any port in the United States. An order to this effect (copy of which is inclosed) has already been issued by Major-General Shafter at Tampa, Fla., and it is requested that a similar order be issued through the proper officer at New Orleans and Mobile, or at other ports where troops may embark.

Respectfully, yours,

L. J. GAGE, *Secretary.*

The SECRETARY OF WAR.

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, D. C., July 16, 1898.

SIR: Acknowledging the receipt of your letter of May 31 last, inviting attention to the precautions deemed necessary by the Treasury Department to prevent the introduction of yellow fever from Cuba during the coming summer and fall through vessels engaged in transporting troops and supplies from the ports of New Orleans, Mobile, and Port Tampa, and requesting that the proper officers of this Department be directed to instruct masters of transport vessels that they are forbidden to bring any refugees from Cuba on their return to ports within the United States, etc., and also requesting that an order be issued requiring the masters of these transport vessels to submit to the regular quarantine examinations and necessary restraints upon arriving at any port of the United States, I have the honor to inform you that on the 24th ultimo copies of your communication were referred to the commanding general, Department of the East; the commanding general, United States forces, Miami, Fla.; the commanding general, United States forces, Jacksonville, Fla.; the commanding general, United States forces, New Orleans, La., and the commanding general, United States forces, Tampa,

Fla., to issue the necessary instructions from their headquarters to carry out the wishes of the Treasury Department as indicated in your letter.

On the 6th instant the commanding general, Seventh Army Corps, Jacksonville, Fla., reported that copies of the papers referred to had been furnished to the United States Marine-Hospital surgeons at Miami and Jacksonville, Fla., for their information and guidance.

Very respectfully,

H. C. CORBIN,

Adjutant-General, for the Secretary of War.

The SECRETARY OF THE TREASURY.

EFFORTS TO PREVENT LANDING OF SICK AND WOUNDED FROM CUBA AT SOUTHERN PORTS.

In addition to the above precautions the Bureau kept as well informed as possible of the movements of troops and transports by frequent communication by telephone with the various bureaus of the War Department, and a verbal agreement was made, in accordance with which vessels returning from Cuba bringing sick and wounded, should land the same at Northern ports rather than at Southern. This agreement was for the most part observed, but there were several exceptions which created grave concern. A number of transports, however, arriving at Southern ports were ordered to Northern ports for debarkation.

The following letter was addressed to the Surgeon-General of the Army, urging that patients or convalescents from Santiago be not landed at Fort Monroe:

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,
Washington, D. C., July 14, 1898.

DEAR SIR: Referring to previous conversations relative to the reception of the sick and wounded from Santiago at a general hospital at Fort Monroe, I transmit herewith a copy of the quarantine regulations of the Treasury Department, in the marked portion of which it will be seen that at ports south of the southern boundary of Maryland—and Fort Monroe comes within this category—in ordinary times all merchant vessels arriving from ports infected or suspected of being infected with yellow fever are obliged to undergo disinfection and detention of from three to five days.

This quarantine provision was very carefully drawn by a board of officers of this Service, and then submitted to a convention of the quarantine officers of the various municipalities of the South Atlantic and Gulf States, and its necessity was unanimously concurred in.

This shows that the neighborhood of Fort Monroe is considered easily infectible territory, requiring more stringent quarantine regulations relating thereto than to points north of the southern boundary of Maryland.

It is probable that the sick and wounded who have arrived yesterday and to-day and will arrive to-morrow will be free from infection of yellow fever, but with the rapid increase of yellow fever in and around Santiago the same assurance can not be felt in the near future. The steamers from Santiago bringing wounded, it is true, require about five days, during which time yellow fever would probably manifest itself if aboard the vessel. Nevertheless, unless thorough disinfection of clothing, bedding, etc., from Santiago is enforced, which measures seem to be

impracticable and impose hardship upon the wounded who are anxious to debark, there is sufficient ground for dreading the introduction of the disease.

It is with great satisfaction that I have received information from you that no more sick and wounded would be transported through Florida ports, and I earnestly urge that Fort Monroe be not made an entrepôt for the sick and wounded from Santiago, believing that it will add but little discomfort if the wounded are carried to points still farther north.

Very respectfully,

WALTER WYMAN,
Supervising Surgeon-General N. S. M. H. S.

Brig. Gen. GEORGE M. STERNBERG,
Surgeon-General United States Army, Washington, D. C.

PROTEST OF THE BOARD OF HEALTH OF PORTSMOUTH, VA., AGAINST
THE DEBARKATION OF TROOPS FROM CUBA AT THAT PORT.

As further illustrating the concern felt at Southern ports regarding communication with Cuba, the Bureau received the following protest:

OFFICE OF THE CITY CLERK, COUNCIL CHAMBER.

Portsmouth, Va., July 19, 1898.

DEAR SIR: In view of the possibility of the importation of yellow fever from persons arriving here from Santiago and other infected ports, the board of health of this city respectfully requests that no more persons from infected districts be sent to this port.

Very respectfully,

E. THOMPSON, Jr., *City Clerk.*

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

PROTEST AGAINST TRANSPORTING REFUGEES TO TAMPA.

TREASURY DEPARTMENT,

Washington, D. C., July 30, 1898.

SIR: I have to invite your attention to the following telegram received this day by the Surgeon-General of the Marine-Hospital Service, from P. A. Surg. A. H. Glennan, of the Marine-Hospital Service, and Dr. J. Y. Porter, State health officer of Florida, dated Port Tampa, Fla., July 30, 1898, as follows:

"Two transports from Santiago with 150 passengers arrived at quarantine to-night. Is this not in violation of agreement between Secretaries Treasury and War? Can not transports bringing troops and passengers from Cuba proceed direct North? If not, camp at Egmont and Tampa Bay quarantine will be soon overcrowded. Surgeon Purviance, now here, coincides with this."

Referring to the above, I respectfully invite attention to my letter of May 21 and your reply thereto of July 16, 1898, from which correspondence it will be seen that masters of transport vessels have been forbidden to bring any refugees from Cuba on their return to ports in the United States, etc.

It would appear that the 150 passengers are practically refugees from Cuba, and I would request that the attention of the masters of the two transports be called to the matter and that such other action as may be necessary be taken to prevent other transports from bringing passengers or refugees.

It is believed to be in the interest of the War Department to prevent this passenger traffic, as it entails additional delay upon the transports in at quarantine.

Respectfully, yours,

O. L. SPAULDING, *Acting Secretary.*

THE SECRETARY OF WAR.

PRATIQUE OF QUARANTINE OFFICER AT PORT TAMPA REQUIRED OF
ARMY TRANSPORTS.

The following letter was written to still further enforce the observance of quarantine on the part of transports:

TREASURY DEPARTMENT,
Washington, D. C., July 21, 1898.

The COLLECTOR OF CUSTOMS,
Port Tampa, Fla.:

You are directed to enforce the quarantine regulations at Port Tampa with regard to vessels from Cuban ports, including Santiago, as though they were vessels from a foreign port, and refuse entry to any transports or others which have not the certificate of Tampa Bay quarantine officer.

O. L. SPAULDING, *Acting Secretary.*

QUARANTINE AUTHORITY SUSTAINED NOTWITHSTANDING WAR
MEASURES.

Having seen in the public prints an opinion given by the attorney-general of the State of Florida, in response to a request of the State health officer, and stating that the laws of Congress declaring war and authorizing its conduct, supersede the State quarantine regulations to the extent of the inquiry made; in order to show that the quarantine regulations were not superseded in practice I addressed the following letter to the State health officer of Florida:

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL, M. H. S.,
Washington, D. C., July 19, 1898.

SIR: I have received a copy of the letter of Attorney-General W. B. Lamar, of the State of Florida, addressed to the governor, giving his opinion upon a question propounded by yourself relating to the usurpation by the United States military authorities of the functions and putting aside the power of the State board of health. The closing paragraph of his letter states that "while martial law has not been declared in Florida, * * * yet the laws of Congress declaring war and authorizing its conduct are in force, and these supersede the State quarantine regulations to the extent of the inquiry made by the State health officer." Recognizing the difficulties almost certain to ensue in enforcing any quarantine regulations in the midst of war, some time ago I prepared letters for the signature of the Secretary of the Treasury, addressed to the Secretary of War and the Secretary of the Navy. Copies of the correspondence with the Secretary of the Navy and with the Secretary of War are inclosed for your information. It will be seen from this correspondence that both the Navy Department and the War Department have agreed to aid in the enforcement of the quarantine regulations.

Respectfully yours,

WALTER WYMAN,
Supervising Surgeon-General U. S. M. H. S.

Dr. J. Y. PORTER.
State Health Officer, Jacksonville, Fla.

DETENTION CAMP ON EGMONT KEY.

Early in the summer it became evident that there would be much communication between the island of Cuba and Port Tampa, Fla.,

used as a base of operations by the Army. It seemed, therefore, imperative that provision should be made for holding in detention persons brought from Cuba intending to land at Port Tampa. The State quarantine station for the port of Tampa, situated at the mouth of Tampa Bay, had no provision for the detention of people. Accordingly it was determined to establish a detention camp on Egmont Key, 2 miles from the State quarantine on Mullet Key, 25 miles from Port Tampa, at the entrance to the bay. The Bureau was confirmed in its determination by representations of those engaged in transportation and by a special request from the State health officer of Florida. Despite great difficulties the camp was established. Without it there would have been no adequate provision for preventing the introduction of yellow fever. During the winter it is proposed to improve the site and the buildings, there being no doubt of its equal or greater necessity during the coming season.

Following are extracts from the reports from the several officers detailed to establish, inspect, and command the camp:

EXTRACTS FROM REPORTS OF P. A. SURG. H. D. GEDDINGS.

OFFICE OF MEDICAL OFFICER IN COMMAND,
MARINE-HOSPITAL SERVICE,
Port Tampa, Fla., May 31, 1898.

I have the honor to acknowledge the receipt of Bureau letter dated May 23, 1898, and would state that delay in answer thereto was unavoidable.

Referring to clearing a camp site, I have the honor to report that 9 acres are being cleared, at an expense of \$100 per acre. The work is expensive, owing to the fact that the numerous palmetto trees must be grubbed out by the roots and carted away, the holes being filled up and ground leveled. This is not only necessary to clear the ground, but the trees themselves harbor all kinds of insects, and mostly of a dangerous kind, as scorpions, centipedes, etc.

Four water tanks have been purchased, of 2,500 gallons each, which will cost in place \$200.

A building for use as a fumigating shed has been contracted for, work on which will be immediately proceeded with, as per inclosed sketch and specification, at a cost of \$800. All disbursements to be made by the Plant Improvement Company, bills for the same to be rendered in their favor. So much of the preparatory work was necessary if the camp was to be established or not.

I have the honor to recommend the erection of two strongly constructed buildings, 24 by 90 feet and one 24 by 40 feet, to be used as store houses for tentage and heavy material, it being impracticable to use the Ducker portable houses for that purpose, owing to the extreme lightness of their construction, entirely unfitting them for the great weight of material necessary to be stored when the camp is not in use. The same objection may be urged against their use for kitchen purposes. These buildings will cost, complete, \$2,500. The Ducker buildings, if sent to this camp, can be used for other equally necessary purposes.

The fact that Egmont Key is already the site of active military operations, batteries being erected which will be garrisoned, and a detachment of Naval Reserves being already camped thereon, in my opinion renders a fence an imperative necessity. A wire fence of at least seven wires is recommended, which will cost about \$500.

The purchase of material and supplies is being attended to with due care to economy and quality of articles. Owing to the extensive purchase of goods for the military service, the unsettled state of the market, and there practically being no competition here, procuring competitive proposals is impracticable, but so far only fair prices have been charged.

The kitchen outfit has been ordered direct from the John Van Range Company, of Cincinnati, Ohio, and is probably en route at this time.

It is requested that the recommendations as to buildings and fence may be acted upon as soon as practicable and authority be communicated by wire, as the situation here is such that prices are more than likely to advance sharply without notice. The demand at this point for lumber and other building material is enormous, and only with difficulty have estimates for the work recommended been procured. Transportation facilities are inadequate, owing to the practical suspension of shipments by water to this section.

OFFICE OF MEDICAL OFFICER IN COMMAND, M. H. S.,

DETENTION CAMP,

Egmont Key, Fla., August 11, 1898.

In obedience to your telegram of this date, I have the honor to present for your consideration a report of the operations of this camp up to and including this date.

The camp was suddenly opened on Saturday, July 30. I had arrived at Port Tampa on the Wednesday evening preceding and had reported to Passed Assistant Surgeon Glennan, in accordance with your orders. By his direction I had visited this place on Thursday and Friday, for the purpose of putting the finishing touches to the work of construction, and on the latter day had carried back with me to Port Tampa Hospital Steward Richardson, whose condition forbid a longer residence here. At this time there seemed little probability of the early use of the camp, by reason of the request of the Treasury Department on the War Department that transports returning to Tampa should not bring passengers. Late on Friday night a telegram was received announcing the arrival at quarantine of the steamship *Santiago*, from Santiago de Cuba, with reputedly 130 passengers on board. That night was therefore spent in making out an order for stores and supplies, and early on Saturday morning I started for Egmont, accompanied by Steward Peck, who had arrived on the preceding morning. The landing was commenced and completed in the ship's boats by 2 p. m. and every one promptly housed or tented and fed. The number had increased from the reputed 130 to 187 by actual count. Many of them, the whole company consisting of officers and enlisted men, should never have been sent on shipboard at the time. Many were barely convalescent from yellow fever and had just been discharged from the hospital at Siboney; some were suffering from commencing and advanced attacks of enteric fever; there were cases of dysentery, and cases of malarial disease too numerous to mention. The condition of things may be imagined when I state that the first sick calls morning and afternoon after arrival occupied respectively four and two and one-half hours. Almost all were in a condition of pitiable prostration, and I think I am within bounds when I state that there were not twenty well men in the entire lot.

Such was the condition of affairs when, on Monday afternoon, a heavy rain, accompanied by much wind, set in. Both increased in violence, and by midnight it was blowing a full gale, with occasional bursts of hurricane violence. Daylight revealed the fact that thirteen of the new mosquito-proof tents were completely destroyed; two wall tents were torn to pieces; bedding was blown away and never recovered. The tents in which the officers had been quartered had

suffered the most, and as rapidly as possible they were gotten into one of the mess-rooms and storeroom and put into tolerably dry beds. The gale continued during Tuesday, abating by sunset, but the rain continued during the night.

There is no doubt that if the buildings had not been of unusually substantial construction and kept tightly closed, they would have been unroofed and destroyed. Had it not been for the active exertions of Steward Peck much more suffering would have resulted.

After a detention of eight days 180 of those able to travel, their baggage having been disinfected, were put on the steamship *Segurança* and sent to New York. Most of the officers elected to complete their ten days of detention, and proceeded on their way north by train from Port Tampa, leaving us only those too ill from enteric fever to travel. Their places were promptly taken by a lot of teamsters and stevedores from waiting transports, and the camp to-night contains approximately 180, within a few of its full capacity, as we have but six more tents on hand.

OFFICE OF MEDICAL OFFICER IN COMMAND M. H. S.,

DETENTION CAMP,

Egmont Key, Fla., August 18, 1898.

I had the honor, under date of the 11th instant, to report to you on the operations of this camp from its opening on July 30 to that date, inclusive.

Since then admissions to camp have brought the total number passed through camp up to 364, with the addition of 28 officers and men of the Signal Corps, who, having been twenty-one days on shipboard, and having never been landed on Cuban soil, were released, with disinfection of baggage, and proceeded to Huntsville, Ala.

The present occupants of the camp consist solely of the patients sick in hospital, 10 in number, and 2 officers of the Revenue-Cutter Service, who were removed from the steamship *Mascotte* en route from Key West to Port Tampa. As these officers have been continuously on shipboard for one hundred and seventeen days, engaged in the blockade of Cuban ports, and were simply unfortunate in landing in Key West at the time that there were cases of suspicious fever prevailing in that city, they will, by request of the State health officer of Florida, be released after five days' detention and fumigation of baggage.

I am glad to be able to report that no cases of yellow fever have made their appearance in camp and that there have been no developments of enteric fever traceable to conditions prevailing here. Since the opening of the camp there have been 5 deaths, 2 colored and 3 whites. Of these, 2 whites were from dysentery, 1 white and 1 colored from enteric, and 1 colored from pyo-nephrosis. I regret to have to report that 1 more death from enteric fever (white) may be expected at any moment. The best that was possible under the conditions prevailing was done for all these patients, but as the camp was opened with the defined purpose of preventing the introduction of infectious disease into the United States, and not as a hospital camp, which it practically was during the first ten days of its career, preparations had not been made on a scale sufficiently elaborate for the diet, nursing, and care of cases of the nature which presented themselves. The patients are comparatively comfortable in a large tent hospital at the present time, but the skilled nursing and diet necessary for their condition can only be indifferently supplied by the best in both lines which we are able to procure in this vicinity.

I suppose that, should the fever in Key West prove to be yellow fever, and should it assume epidemic form, the camp will have to assume charge of the non-immune passengers brought by the Plant steamers to Port Tampa.

A further report will be made at the end of another week.

EXTRACT FROM THE REPORT OF P. A. SURG. A. H. GLENNAN.

OFFICE OF THE COLLECTOR OF CUSTOMS,

Port of Tampa, Fla., August 12, 1898.

In reply to Bureau letter of the 5th instant, in relation to the landing of passengers at Egmont Key from the transport *Santiago*, I have the honor to make the following report:

Dr. Geddings arrived at the time stated—the night of July 27—and on the following morning was sent to Egmont Key, in accordance with your directions. On the afternoon of July 29, during my examination by the service board, Dr. Geddings came up to Port Tampa, bringing Steward Richardson, whom he said he was afraid to leave in camp on account of his sickness. That same evening a dispatch was received announcing the arrival of the *Santiago*. Dr. Geddings immediately made preparations to return at daylight, taking Steward Peck with him, who arrived at this port the same day. The passengers from the *Santiago* were transferred on the afternoon of this day (Saturday, July 30) and made as comfortable as possible, and given fresh meat, vegetables, large supply of ice, etc.

I wired that the camp could be opened. Dr. John Guiteras told me it was beautifully arranged, and the inmates were as well satisfied as could be in such a place. A few days after opening a hurricane blew down a number of tents and drenched the place, at the same time wrecking the gangway to the Mullet Key station, 2 miles away, knocking a hole in the quarantine steamer *Germ* and beaching her. These are passing incidents in this climate.

Sickness and changing of officers and assistants in emergency work of this character necessarily complicate the matter. Steward Richardson's services have been invaluable.

In conclusion, I beg leave to say that Dr. Geddings has carried on the administration of the camp in a very commendable manner and under great difficulties, owing to the large number of sick, who should not have been shipped in the condition they were—many unable to walk, and others in the same clothes given them at the yellow-fever hospital at Siboney. Work was carried on at this end late at night in getting malted milk and extras for their use. I inclose copy of a letter from General Duffield, an inmate of the camp, as to the treatment and care taken, and am told that other letters of a similar character were sent out voluntarily for publication.

[Inclosure.]

EGMONT KEY, FLA.,

Quarantine Station, August 9, 1898.

DEAR SIR: I feel that I ought to express my appreciation of your diligence, attention, and courtesy to myself and the other officers who were put ashore from the S. S. *Santiago* ten days ago.

I do not see how anyone could possibly have done more under all the circumstances, and this has been the universal expression among the officers.

I believe they are all, as I am, most grateful to you for your kindness.

Sincerely,

HENRY M. DUFFIELD.

DR. H. D. GEDDINGS,

In Command Egmont Key.

REPORT OF TRANSACTIONS.

By Acting Asst. Surg. G. M. CORPUT.

OFFICE OF MEDICAL OFFICER IN COMMAND, M. H. S.,

DETENTION CAMP,

Egmont Key, Fla., October 4, 1898.

SIR: In compliance with Bureau telegram of the 3d instant, directing me to report in detail the transactions of this camp from the date of the first arrivals to September 30, 1898, I respectfully beg to submit the following:

A résumé of the weekly reports of P. A. Surg. H. D. Geddings, the former com-

mandant of the camp, shows that the first arrivals consisted of 194 soldiers direct from Santiago de Cuba, about 32 of whom were commissioned officers, and 1 female, a relative of an army officer. Of this lot there were approximately 20 well men. The remainder seem to have been entirely made up of convalescent patients from the army hospital at Siboney, and all showing the effects of disease and insufficient nourishment.

These unfortunates arrived in camp on July 30, about three hours after the arrival of Dr. Geddings and the hospital steward, without any previous notification, and as a result the working force of the camp consisted of 1 engineer, 1 cook, 2 carpenters, and 8 guards and laborers, all more or less untrained and ignorant, and entirely incompetent to handle this number of people.

On August 1, after two days and nights of unceasing work, the conditions were greatly improved, when a violent gale began, which before dying out destroyed or injured every piece of property not in the buildings, and causing great suffering among the inmates.

The camp was rebuilt, and on August 7 the greater part of the enlisted men (130) were transferred by transport to New York, and on the 9th of the same month the remainder, with the exception of ten left in the hospital who were too seriously ill to be moved, were discharged at the completion of ten days' detention, and proceeded to their various destinations by rail.

Five deaths resulted from enteric fever and dysentery, but no contagious diseases made their appearance.

On August 9 124 men, consisting of army teamsters and stevedores from Santiago, arrived, and on the 10th 43 more, all of whom were released after the expiration of the ten days.

The first of the refugees from Key West, in the persons of two revenue-cutter officers, arrived on August 18, having passed through Key West from the blockading line on the way north.

Captain Clarke's company of volunteer signal corps (3 officers and 25 men) were allowed to proceed after disinfection of their baggage. They came into camp on August the 16th, after being on shipboard constantly for a period of twenty-one days, but as they had not landed in Cuba it was deemed advisable to release them, after communicating with the State board of health.

Refugees continued to arrive from Key West in small numbers on each trip of the steamer *Mascotte* until September 8, the total number having passed through camp from that place being 214. No persons from Cuba were received in camp during the intervening period, but on September 1 28 arrived and on September 2 36 additional, all being teamsters, pack-train men, and other attachés of the army at Santiago.

Miss Clara Barton and staff arrived from Havana September 3, and after the usual disinfection underwent the period of detention and were released. The Red Cross supplies which she had with her were not disinfected, owing to the fact that all were in original packages and had not been landed in Cuba.

The last arrivals in camp were five persons from Havana, brought by the steamer *Mascotte*, but two of these secured satisfactory evidence of immunity and were released before the expiration of the regular period.

It may be well to add that the period of detention of all persons from Key West was reduced to five days, after consultation and upon request of the Florida board of health.

The last refugee, one who had been in hospital since September 1, was discharged and sent to his home on October 1.

No cases of contagious disease have made their appearance, which, considering the prior places of residence and the exposure, seems little short of a miracle, and the fact that but six deaths have occurred from the numbers of seriously ill is remarkable.

The Service has been unfortunate in losing the services here of Assistant Surgeon Foster, who was removed to Savannah while suffering from enteric fever, and latterly of Passed Assistant Surgeon Geddings, who was compelled to go on sick leave September 27 from the effects of a continued attack of malarial fever, while almost every one who has been connected with the camp has had attacks of malarial fever of more or less intensity.

The illness of Dr. Foster seemed for a time to forebode ill to the future healthfulness of the camp, but no subsequent cases of enteric fever have appeared.

Below I have attempted to tabulate the number and sex of refugees, the number of cases of disease appearing among them, and the deaths, with cause:

Received from—	Refugees.	Males.	Females.	Cases of malaria.	Cases of enteric fever.	Cases of dysentery.	Cases of yellow fever.	Deaths	Cause of death.
Santiago	454	453	1	230	9	93	0	6	3 enteric fever.
Key West	214	189	25	72	0	7	0	0	2 dysentery.
Havana	20	17	3	1	0	1	0	0	1 pyo-nephrosis.
Total	688	659	29	303	9	101	0	6	

In regard to the various factors which have given rise to much of the discomfort, and from which some criticism has been made public, the original reports of Passed Assistant Surgeon Geddings amply cover, and I will only endeavor to give subsequent histories.

The greater part of the swamp and its surrounding low ground has almost entirely dried up, and can be obliterated at any time by the expending of time and labor necessary to fill it in. This I believe to be absolutely necessary if the camp should ever be used again during the wet season, as the swamp covers the most eligible portions of the reservation.

I respectfully beg to again invite the attention of the Bureau to the fact that the Engineer Corps of the Army have in the neighborhood of 250 negroes and whites of the worst possible type at work on the fortifications a few hundred yards from this camp, and as they are absolutely without discipline some effective methods of guarding the property here must be considered in connection with the future of the camp.

In closing, I can not refrain from inviting attention to what seems to me to be the most serious drawback of the camp, namely, the necessity of dealing directly or indirectly with the Plant System for almost everything in the way of subsistence and supplies, and the unusual and almost exorbitant prices on every article purchased.

In compliance with Bureau telegram of the 1st instant, all employees not absolutely necessary have been discharged, and the working force now consists of the following: One engineer, 2 carpenters, 6 laborers, 2 waiters (1 acting cook), 1 laundress.

All refugees have been discharged.

Respectfully, yours,

G. M. CORPUT,

Acting Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

DISINFECTION OF THE STEAMER NICTHEROY, AFTERWARDS U. S. CRUISER BUFFALO.

The following is illustrative of the extraordinary precautions made necessary by the war:

The steamer *Nictheroy*—or *Buffalo*, as she was renamed when purchased for service in the United States Navy—arrived at Cape Charles

quarantine station on the 7th of June, 1898, thirty-three days from Rio de Janeiro and fourteen from Para. While there was no illness on board, the ship was very dirty, and in view of the fact that she had lain in the harbor of Rio for four years, and was destined for Newport News to be entirely refitted as an auxiliary cruiser, the quarantine officer at Cape Charles telegraphed as follows:

FORT MONROE, VA., *June 8, 1898.*

Impossible to disinfect *Nietheroy* to render safe. Full of rotten timbers. No doors or hatches. Hold open and half full of coal covered with dirt and rust. Best disinfection will not render safe to remove rotten timbers for repairs at Newport News. She is too deep draft for Fisherman's Island, and I recommend that she go North for repairs. I protest against her going to Newport News for repairs. The ship is a hulk, and has been anchored for four years in Rio harbor, and is probably infected.

PETTUS,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

DETAIL OF BOARD OF OFFICERS TO REPORT ON THE SANITARY *
CONDITION OF THE U. S. S. BUFFALO.

On June 9, 1898, I directed P. A. Surg. J. H. White and P. A. Surg. W. J. Pettus to investigate the condition of the vessel thoroughly and to make a report on the same.

Following are the orders convening the board and the report of same:

TREASURY DEPARTMENT,

OFFICE OF THE SUPERVISING SURGEON-GENERAL M. H. S.,

Washington, D. C., June 9, 1898.

SIRS: You are hereby convened as a board to determine upon the steps necessary to be taken in the matter of disinfection of the U. S. S. *Nietheroy* or *Buffalo*, now held in quarantine at the Cape Charles Quarantine Station.

This vessel, I am informed, left Rio on May 5, having been in the harbor of Rio for the last four or five years. Your attention is called to the large number of cases of yellow fever reported in the public health reports from Rio from January to the present time. As this vessel is to undergo certain repairs at the Portsmouth, Va., Navy-Yard, the importance of making her perfectly safe is obvious. At the same time it should be borne in mind that the Government is anxious to have the changes made as soon as possible.

You are authorized to adopt any measures which may be necessary in reason to render this vessel safe if, after consideration, it is deemed possible to render her safe for repairs, etc., in that latitude.

Captain Hopkins, a lawyer of Washington, representing Mr. Flint, of New York, who was the agent for the purchase of the vessel by the Government, has been authorized by Mr. Flint to make any disposition of the cargo and of the superfluous woodwork of the vessel that may be deemed necessary.

The board will confer with Captain Hopkins. You are directed to wire your recommendations, and, if the board determines to disinfect the vessel at the Cape Charles Quarantine, to proceed immediately without waiting reply.

Copies of telegrams relating to this vessel are inclosed. Inclosed also is a letter from the Surgeon-General of the Navy, and you are further informed that the

Bureau has the support of the Bureau of Navigation of the Navy Department in the matter of rendering this vessel perfectly safe before work is commenced upon her.

The board will not adjourn until this vessel is given pratique.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

P. A. Surg. J. H. WHITE, *Chairman.*

P. A. Surg. W. J. PETTUS, *Recorder.*

REPORT OF BOARD.

OFFICE OF MEDICAL OFFICER IN COMMAND, M. H. S.,

Cape Charles Quarantine, June 13, 1898.

SIR: We have the honor to submit below the findings of the board convened to report on the condition of the steamship *Nietheroy*, under Bureau order June 9, 1898.

The steamship *Nietheroy* entered quarantine June 7, 1898, and, upon being boarded by P. A. Surg. W. J. Pettus and Asst. Surg. C. H. Lavinder, her condition was found to be as follows:

Spar deck.—Mechanically dirty; boats and woodwork of superstructure decayed; quarters, except captain's cabin, dirty, but not excessively so. This portion of the ship probably not infected.

Main deck.—Forward forecastle, anchor, engine and windlass stationed in the center were very dirty. Just outside this forecastle were water-closets on either side, the drain pipes of which were completely plugged up and filled with fecal matter which had overflowed on the deck. One of these closets was leaking badly down on the deck below. Forward end of main deck saturated with fecal matter, and this entire deck filthy; sides and overhead very dirty and greasy; after fore-castle on this deck very filthy; fecal matter found in places all over this deck, and even on spar deck forward. The drawers of a desk in purser's cabin on the after part of main deck showed evidences of having been used for fecal deposits. The after storerooms fairly clean.

Lower deck.—Forward sail locker in fair condition; aft of the sail locker this deck grimy and greasy and polluted by the leakage of the water-closet above, and containing a great deal of junk; second compartment dirty and littered with junk. Aft of the engine room this deck contained coal.

Lower hold.—Filled with coal, except the forward compartment, the front half of which contained a mezzanine deck and appeared from the boarding on the sides to have been used as an improvised magazine. This compartment reasonably clean.

Main and lower decks are of wood overlying steel. There were practically no hatches for the different holds, and those existing did not fit accurately. But very few of the doors could be absolutely closed.

The ship was disinfected as nearly in accordance with the regulations as structural conditions would allow; but the presence of so many openings prevented effective work with either sulphur or formaldehyde.

The main and possibly the lower deck having a history of supersaturation with human filth, and the vessel having lain at anchor in Rio Harbor for four years with from 300 to 400 men and boys aboard, and having been received by the present captain, as we are informed by the mate, with tangible evidences of fecal fouling of the decks for an indefinite period, it is deemed inadvisable to grant a pratique to this vessel for any point south of the southern boundary of Maryland, for the following reasons:

(1) The board is informed by the naval constructor at Newport News that it is the intention of the Navy Department to replace every particle of worn-out or

rotten iron or wood in this vessel with new material, and this will involve the ripping out of a great deal of the main deck and possibly some of the lower deck, with the resultant opening up of air spaces which have long been sealed up, which were beyond the reach of any disinfectant at our disposal, and of whose infection there is at least a probability.

(2) The coal in this vessel must of necessity be considered as undisturbed ballast, and in view of the necessity of ripping out the woodwork it would also come somewhat in the same category. The cost of removal of coal and woodwork at this station would be, both in time and money, vastly in excess of the cost of such removal at a northern point, and it is only after such removal and absolute emptying of the vessel that the board could possibly consider the ship in a condition for perfect disinfection with a view to the structural changes contemplated.

It is therefore recommended that the steamer, having already been given ordinary disinfection, be allowed to proceed to the port of New York, where her owners desire to take her in order to do the repairs to boilers and machinery called for in their contract.

Very respectfully submitted.

J. H. WHITE,

Passed Assistant Surgeon, U. S. M. H. S.

W. J. PETTUS,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

CORRESPONDENCE WITH THE SECRETARY OF THE NAVY.

JUNE 13, 1898.

SIR: I am informed by the Surgeon-General of the Marine-Hospital Service that the steamer *Nietheroy* or *Buffalo*, which recently arrived at the Cape Charles Quarantine from Rio Janeiro, has been inspected by two medical officers of the Marine-Hospital Service with a view to determining upon the safety of admitting her to Newport News for the purpose of making necessary repairs and alterations.

This vessel arrived at the quarantine in an extremely filthy condition, and has been for a number of years in the harbor of Rio, which is a harbor infected with yellow fever, this disease having been particularly violent during the past six months.

In tearing out the old woodwork from this vessel there will be danger of those engaged in this labor contracting yellow fever, and at a Southern port, such as Newport News or the Portsmouth Navy-Yard, the danger to be apprehended from an outbreak is so great that it would be unwise to assume this risk.

The vessel should be sent to a Northern port, and even there the "breaking out" should be done at a quarantine station and the old wood should be burned and the men engaged in the work kept isolated and under observation.

Respectfully, yours,

L. J. GAGE,

Secretary of the Treasury.

THE SECRETARY OF THE NAVY.

NAVY DEPARTMENT,

Washington, D. C., June 14, 1898.

SIR: I have honor to acknowledge the receipt of your letter of the 13th instant, stating that the steamer *Nietheroy* or *Buffalo*, which recently arrived at the Cape Charles Quarantine from Rio de Janeiro, has been inspected by two medical officers of the Marine-Hospital Service with the view of determining upon the safety of admitting her to Newport News for the purpose of making necessary repairs and alterations, and suggesting that the vessel be sent to a Northern port, that the

"breaking out" be done at a quarantine station, the old wood burned, and the men engaged in the work kept isolated and under observation.

The Department thanks you for the suggestions contained in your letter and will give the same due consideration.

I have the honor to be, sir, very respectfully,

CHAS. H. ALLEN,
Acting Secretary.

The SECRETARY OF THE TREASURY.

The *Nichteroy* left Cape Charles Quarantine Station for New York on the 14th of June, after disinfection as far as practicable, and arrived at New York Quarantine the following day.

PRECAUTIONS RECOMMENDED REGARDING RETURN OF TROOPS FROM SANTIAGO TO MONTAUK POINT.

On August 2 I was invited to a conference with the Secretary of War and officers of the War Department concerning the contemplated transfer of troops from Santiago to Montauk Point, New York. The advisability of the movement was under consideration and I prepared and transmitted the following letter and memorandum:

AUGUST 3, 1898.

SIR: In reply to your verbal request of yesterday I transmit herewith a memorandum relating to the quarantine precautions necessary to be taken in the event it is decided to transfer troops from Santiago and vicinity to Montauk Point, New York.

If the provisions of this memorandum can be carried out in their entirety and with certainty, I am of the opinion that said transportation will be safe. But if circumstances prevent the enforcement of these measures, I am of the opinion that the troops should remain at Santiago, at least until early fall.

The absolute necessity of removing them from Santiago and the question whether they may not be placed on the hills in Cuba with as good results as would follow their transfer to Montauk is a matter which I am unable to determine with the information at hand, nor do I understand that you have asked my opinion upon this subject. It would seem, however, practicable, unless there are some special reasons, unknown to me, against it, and in deciding the matter I hope I may be permitted to suggest the concern which will be manifested by the people of Long Island and New York, and the fact that the camp at Montauk Point is to be made practically a visiting place for friends of the soldiers, and that many of the latter will be constantly visiting localities in Long Island and New York City.

Therefore I may request that if the precautions mentioned are not taken, in my opinion it will be far better to keep the troops at Santiago.

Respectfully yours,

WALTER WYMAN,
Supervising Surgeon-General M. H. S.

The SECRETARY OF WAR.

(Through the Secretary of the Treasury.)

[Inclosure.]

MEMORANDUM RELATING TO TRANSFER OF TROOPS FROM SANTIAGO TO MONTAUK POINT, LONG ISLAND, NEW YORK.

Precautions at Santiago.

1. The troops intended for a given transport should be separated from the rest of the troops, held under observation in a camp by themselves or quartered on board a transport in Santiago, to be provided for that purpose, and in localities

not infected with yellow fever. They should be held under observation thus from three to five days—five if on land, and three if on shipboard—and while undergoing the period of observation should be inspected at least twice daily by medical officers, and any case of fever suspected of being yellow fever or typhoid should be removed to a hospital camp and the debarkation of such a case postponed, together with those who have been directly exposed if the case be yellow fever. If practicable, the troops should be bathed and given fresh clothing at the beginning of the period of observation. If fresh clothing is not available, their clothing should be sterilized.

2. When not practicable to detain the troops in camps or on transports at Santiago, they should be bathed and given fresh or sterilized clothing immediately before embarkation, and special care should be exercised by the medical inspectors to prevent any case of sickness whatever to embark.

3. All convalescents from yellow fever or suspected yellow fever should be transported on special vessels. They should not accompany healthy troops.

4. Camp equipage and personal effects of troops capable of carrying infection should not be allowed to accompany troops unless disinfected. If new blankets are not available, old blankets may be disinfected by steam in the steerage of the vessel, or otherwise.¹

5. The embarkation of the troops on a transport should be as speedy as possible and performed in daylight and under the direct supervision of medical officers. The sanitary conditions of the troop ships en route should also be under the supervision of medical officers.

Precautions at Montauk Point.

6. Troops arriving at Montauk Point, having been subjected to the preliminary measures at Santiago, as provided in paragraph 1, and having had no contagious disease among them en route, may be permitted to at once proceed to their permanent camp.

7. Troops arriving at Montauk Point, having embarked at Santiago in accordance with the provisions of paragraph 2, even though no yellow fever has developed among them en route, should, nevertheless, on account of the lack of precautionary measures taken at Santiago, be kept under observation for five days in a detention camp.

8. Troops arriving at Montauk Point, among whom yellow fever has occurred en route or on arrival, should be placed in a detention camp and kept under observation for ten days. Cases of yellow fever to be isolated and sent to the hospital camp for contagious diseases.

9. Camps of detention and observation should be located about one mile from the permanent camp, said camps to be surrounded by an armed cordon, and no communication to be held between the permanent camp and the detention camps, or one detention camp with another. There should be three or more of these detention camps provided and separated from one another by not less than one-quarter of a mile.

10. For these detention camps there should be provided two hospital camps, one known as the intermediate hospital, where suspicious cases are to be taken and held until their nature is determined; the other, a contagious-disease hospital, in which should be treated any case of yellow fever that has developed.

11. Transports which have arrived with no sickness aboard, after having been made thoroughly mechanically clean, may be returned to Santiago without awaiting disinfection. They should be provisioned from this side.

12. A transport which has arrived with yellow fever or suspected yellow fever on board must be disinfected before taking troops on again at Santiago.

W. WYMAN,

Supervising Surgeon-General M. H. S.

¹ Large quantities of clothing, blankets, camp equipage, etc., can be disinfected by steam in the steerage, located above the water line of an iron vessel.

RETURN OF TROOPS FROM SANTIAGO HASTENED—MEASURES ADOPTED.

Two days later it was learned that owing to urgency the transportation of troops from Santiago would be begun immediately, and the following letter was addressed by yourself to the Secretary of War:

TREASURY DEPARTMENT, *August 5, 1898.*

SIR: I have the honor to inclose herewith a letter from the Supervising Surgeon-General of the Marine-Hospital Service, together with a memorandum prepared by the latter giving his views as to the precautionary measures that should be taken with regard to landing of the troops from Santiago at Montauk Point to prevent the introduction of yellow fever.

I have to request that this matter be placed before the proper authorities of your Department for the purpose of either securing the adoption of the measures indicated by the Surgeon-General of the Marine-Hospital Service, or a conference between the latter and the officers of your Department, with a view to bring about a cooperation which shall effect the desired end.

Respectfully, yours,

L. J. GAGE, *Secretary.*

The SECRETARY OF WAR.

[Inclosure.]

WASHINGTON, *August 5, 1898.*

SIR: I have learned that the troops at Santiago are to be transferred to Montauk Point and that 7,000 of General Shafter's army will be immediately transported, and that it will be impracticable to take the precautions at the port of departure which were outlined in my letter to the Secretary of War of the 3d instant, forwarded by yourself the same day.

I have, therefore, to inclose the following memorandum giving an outline of the measures which I deem necessary to prevent the introduction of yellow fever with these troops at Montauk Point, and respectfully request that the memorandum be transmitted to the Secretary of War and his attention invited to the necessity of carrying out the provisions of the same.

Respectfully, yours.

WALTER WYMAN,
Supervising Surgeon-General, M. H. S.

The SECRETARY OF THE TREASURY.

MEMORANDUM.

1. Troops arriving on transports from Santiago should be debarked at Montauk Point and divided into groups of not more than a full regiment, say from 1,000 to 1,200 men. These groups should be placed in temporary observation camps, and held under observation for from eight to ten days or longer to insure their freedom from the infection of yellow fever.

2. If yellow fever has occurred in any of the groups under observation they will not be transferred to permanent camp until a sufficient time has elapsed to insure their freedom from infection. No clothing, bedding, etc., directly exposed to the infection of yellow fever should be transferred to permanent camp before being sterilized.

3. Fresh clothing and bedding should be provided for those who have been exposed to the infection of yellow fever before going into permanent camp, or the clothing and bedding in use during the period of observation be sterilized before being transferred.

4. Temporary camps of observation should be separated one from another, with sufficient distance between to insure against the transmission of infection, should any occur. No communication to be held between these camps and the outside, or one with another, save under the proper sanitary supervision.

5. Cases of yellow fever occurring on the transports en route, on arrival, or in the temporary observation camps, should be immediately transferred to a special hospital for this purpose. A detention hospital should also be provided where cases of sickness in which the diagnosis is not determined, also those cases of ordinary illness which have been exposed directly to the contagion of yellow fever en route or in camp could be sent. Ordinary cases of sickness, such as malarial, typhoid fever, etc., should be sent to the general hospital, care being taken, however, to limit the danger of their carrying yellow fever to this general hospital.

6. A floating quarantine plant should be established in the waters conveniently near by for the purpose of disinfecting the transports. Disinfecting apparatus should also be established near the point of debarkation for the purpose of disinfecting the personal effects of the troops and other articles taken from the vessels which are liable to convey the infection of yellow fever.

On August 6 I was invited to another conference with the Secretary of War, the Surgeon-General, and the Quartermaster-General of the Army, and, as a result, the following letter was addressed by yourself to the Secretary of War, and the following telegraphic orders were issued by the Adjutant-General of the Army:

TREASURY DEPARTMENT, *August 8, 1898.*

SIR: Referring to my letter of the 5th instant, inclosing memorandum from the Surgeon-General of the Marine-Hospital Service, I am informed by the latter that, in response to an invitation from yourself, he attended a meeting for consultation in your office with the Surgeon-General and the Quartermaster-General of the Army, on Saturday, the 6th, and that it was agreed that the Marine-Hospital Service should establish a maritime quarantine for Montauk Point, inspecting transports as they arrive and performing necessary disinfection.

In accordance with the understanding arrived at the Surgeon-General has ordered a disinfecting barge and inspecting officers to Montauk Point. P. A. Surg. G. M. Magruder will be in charge of the inspection of transports, and P. A. Surg. J. J. Kinyoun in charge of disinfection of vessels and material.

I have to request that the commanding officer of the camp at Montauk Point be directed to extend necessary and proper facilities to the officers of the Marine-Hospital Service in the performance of their duties.

Respectfully, yours,

L. J. GAGE, *Secretary.*

The SECRETARY OF WAR.

TELEGRAPHIC ORDERS—PRECAUTIONS AT SANTIAGO.

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
August 9, 1898.

COMMANDING GENERAL, FIFTH CORPS,
Santiago de Cuba:

Recommendations of surgeon-generals of Army and Marine-Hospital Service, as follows, should be accomplished as far as practicable:

1. Hold troops assigned to a transport under observation three to five days in separate camp not infected by fever.
2. Surgeons to inspect same twice daily, promptly isolating suspected cases.
3. Bathe and freshly clothe, or sterilize old clothing of troops at the beginning of period of observation.
4. When not possible to detain troops in camps under observation, bathe them

and freshly clothe, or sterilize old clothes before embarkation, excluding, after searching inspection, suspected cases.

5. Yellow fever convalescents or suspects should not accompany healthy troops.

6. No equipage or personal effects capable of conveying infection should accompany troops, unless disinfected by steam or otherwise.

7. Arrange to embark by daylight, under careful supervision of surgeons, who will control sanitary conditions of troopships en route.

By order of the Secretary of War:

H. C. CORBIN, *Adjutant-General.*

TELEGRAPHIC ORDERS—PRECAUTIONS AT MONTAUK POINT.

WAR DEPARTMENT, *August 11, 1898.*

The Secretary of War directs that you cooperate with Surgeon Magruder, United States Marine-Hospital Service, to establish and fix quarantine grounds and anchorage for transports bringing General Shafter's command to Montauk Point. As each transport arrives the quarantine officer will board it, raise the yellow flag, and make personal inspection of the troops on the transport. If no yellow fever cases are found the sick will be removed to general hospital and the well to detention camp, where they will be held three to five days, and then moved to general camp. If any yellow fever cases are found they will be taken off and either put aboard the sanitary barge or put in yellow fever hospital. Other sick will be moved to general hospital, and the well be detained in the detention camp eight or ten days. No person will be allowed aboard a transport while the yellow flag is up without a written pass of Surgeon Magruder. A revenue cutter has been ordered to Montauk Point to enforce sanitary and quarantine harbor regulations.

H. C. CORBIN,

Adjutant-General, U. S. A.

General YOUNG,

Montauk Point, Long Island.

UNITED STATES MARITIME QUARANTINE AT MONTAUK POINT.

In anticipation of some such necessity as the Montauk quarantine the contractors who were constructing the disinfecting barge *Protector* at Philadelphia had been directed to hasten its completion, and were authorized to employ extra labor and work at night. The barge was completed and immediately towed to Montauk, arriving there twenty-four hours in advance of the first transport. Two hospital stewards and 21 attendants, the latter detailed from several of the quarantine stations and marine hospitals, were directed to join the barge at Philadelphia, and the following-named medical officers were ordered to Montauk Point for quarantine service, viz:

P. A. Surg. G. M. Magruder (in command), P. A. Surg. J. J. Kin-youn (in charge of disinfection), P. A. Surg. J. B. Stoner, P. A. Surg. E. K. Sprague, Asst. Surg. Hill Hastings, Asst. Surg. Sherrard Tabb, Asst. Surg. Mark J. White, Sanitary Inspector W. F. Brunner (yellow fever expert).

Two of the foregoing medical officers were detailed on account of the assistance they could render, but more particularly to familiarize

them with quarantine procedures, advantage being taken of so valuable a field of instruction. By request the Light-House Board buoyed out the quarantine anchorages, the Revenue-Cutter Service sent a cutter to convey supplies and perform other necessary service, and the Navy Department sent two small vessels of the auxiliary navy to serve as a patrol. The Quartermaster's Department furnished a boarding vessel.

The following instructions were transmitted by telegraph to Passed Assistant Surgeon Magruder:

You are to establish a national quarantine by request of Secretary of War. Army will manage detention camp. Instructions are to inspect vessels as they arrive, raise yellow flag on them, and you are to have control of them until flag comes down. On inspection, typhoid and other nonquarantinable diseases will be reported to medical officer of Army in charge, for proper disposition, and likewise cases of yellow fever or suspected yellow fever. After sorting out these, the remaining troops can be landed to go into detention camp, with such precautions regarding those specially exposed as is necessary, including disinfection. * * * After discharge of troops, vessels and crews to be taken to barge *Protector* for thorough and rapid disinfection. * * * Cause as little delay as possible in inspections. * * * Prevent communication with vessels while in quarantine.

The first transport, the *Gate City*, arrived on August 13, 1898, and from that date until September 13 there were thirty-two arrivals at the quarantine.

The quarantine procedures were in no way different from those pursued at any national quarantine station as regarded the inspection of the vessel and crew and the treatment of the vessel.

All vessels on arriving were thoroughly inspected, and all sick examined carefully in order to detect any symptoms of yellow fever. If any sick were found—and there were some sick on all of them—the cases were reported to the medical officers of the United States Army for removal. All care of the troops, whether well or not, after removal from the vessel devolved on the War Department, and were received and retained in detention camps and subsequently transferred to the main camp.

In the case of the arrival of a transport infected with yellow fever, as in the cases of the transports *St. Louis* and the *Grande Duchesse*, after the removal of the cases of yellow fever the remaining troops were bathed on board of the *Protector*, and were—through the Quartermaster's Department of the Army—furnished with new uniforms; their clothes were disinfected in the chambers of the *Protector*, and they were then turned over to the military authorities, after which the vessel was thoroughly disinfected.

Upward of 17,000 troops returned from Santiago to the United States, via Montauk Point; of these there were more than 2,200 sick with various diseases, but in all this number there were only four cases of yellow fever, two of the cases occurring on the *Grande Duchesse*—the men

were ill on arrival—and the other case developing on the *St. Louis*, two days after her arrival at Montauk Point. This last transport had had a death at sea during the voyage which had been attributed to yellow fever.

There was no delay in either making the inspections or in the quarantine treatment of passengers or vessels, and with the aid of vessels loaned by the Navy Department and the Revenue-Cutter Service there was no break in the efficiency of the quarantine maintained. Thanks are due to the Light-House Board, Revenue-Cutter Service, and Medical Department and Quartermaster's Department of the Army for their cooperation. Acknowledgments have been made to the Secretary of the Navy for services rendered by the auxiliary cruisers *Aileen* and *Alfreda*. Detailed reports concerning this quarantine have not as yet been received, the commanding officer and several of the other officers being transferred immediately on the close of the station to yellow-fever-infected points in the South. Following, however, is a tabulated statement of the operations of this quarantine:

Statement of transports which arrived at Montauk Point (Camp Wikoff) August 13 to September 13, 1898, showing number of troops arriving thereon, number of sick, and number of yellow fever cases and deaths reported to have occurred on same.

Date.	Name of transport.	Number of troops.	Number of sick.	Remarks.
1898.				
Aug. 13	Gate City.....	551	41	No yellow fever.
14	Vigilancia.....	699	21	Do.
14	St. Louis.....	872	24	Crew, 330; 1 death from yellow fever during voyage; no yellow fever cases on arrival at quarantine; 1 case on the 16th.
14	Miami.....	680	34	No yellow fever.
15	St. Paul.....	1,113	-----	Do.
15	Grande Duchesse.....	1,143	-----	Two cases of yellow fever on arrival; 25 suspects.
15	Matteawan.....	527	70	No yellow fever; 2 deaths en route.
18	Comanche.....	488	114	No yellow fever.
19	Mobile.....	1,600	300	No yellow fever; 10 deaths en route.
20	Rio Grande.....	636	30	No yellow fever.
20	Breakwater.....	345	50	No yellow fever; 8 deaths en route.
20	Olivette.....	275	30	No yellow fever; 8 deaths en route. Steamship Olivette ordered to Boston to place sick in hospital there. Left August 22.
21	City of Macon.....	462	92	No yellow fever; 2 deaths en route.
21	Montera.....	312	20	No yellow fever.
22	Leona.....	528	104	Do.
23	Resolute.....	688	61	No yellow fever; no deaths.
23	Badger.....	186	82	Do.
23	Arcadia.....	185	27	Do.
24	Yale.....	1,069	178	No yellow fever; 1 death en route.
25	Mohawk.....	1,199	130	One suspicious case; 1 death en route.
25	Harvard.....	670	33	No yellow fever; 1 death en route.
26	Santiago.....	489	124	No yellow fever.
28	Minnewaska.....	816	49	No yellow fever; 1 death en route.
30	Specialist.....	118	20	No yellow fever.
30	San Marcos.....	397	5	Ninety-four sick landed in New York; no yellow fever.
30	City of Berlin.....	886	150	No yellow fever; 1 death en route.
31	Panther.....	106	15	No yellow fever.
31	Allegheny.....	480	145	No yellow fever; 14 deaths en route.
Sept. 1	Mexico.....	62	-----	No yellow fever.
11	Saratoga.....	105	-----	207 stevedores; no contagious disease.
12	Missouri.....	249	249	No contagious disease.
13	Vigilancia.....	-----	-----	312 persons; no infection.

NOTE.—The suspicious case of fever noted on the steamship *Mohawk*, arriving on the 25th, was pronounced after necropsy to have been a case of malarial fever.

ARMY TRANSPORT AND PORT-INSPECTION SERVICE.

The following is a copy of correspondence relative to placing officers of the United States Marine-Hospital Service on army transports, and at conquered Cuban and Porto Rican ports, to act as sanitary inspectors:

WAR DEPARTMENT,
Washington, July 30, 1898.

SIR: To expedite the movement of our transports and minimize the danger of their exposure to infection, I have the honor to request:

(1) That medical officers of the United States Marine-Hospital Service be immediately detailed for duty at Santiago, and subsequently at other Cuban or Porto Rican ports under control of the United States forces, to carry out the requirements of the quarantine law of 1893. Such officers to issue certificates and perform other duties of sanitary or port inspectors.

(2) That all sanitary matters pertaining to the condition of transports and crews be placed under the jurisdiction of medical officers of the United States Marine-Hospital Service. Every vessel engaged in the transport service between the United States and Cuban or Porto Rican ports to carry a medical officer of the Army or of the Marine-Hospital Service, whose duty shall be that of sanitary inspector of the vessel, and who shall see that in a foreign port no material or person is taken aboard liable to convey yellow fever; to keep the crews of the transports under surveillance, and on the return voyage act as sanitary inspector.

(3) That there be placed at Santiago and every chief port where practicable a receiving ship for the reception of those who take passage for ports in the United States. This ship would be practically a detention camp and quarantine station, and passengers seeking homeward voyage would be taken from this vessel after they had undergone a period of observation and disinfection of their effects.

The Surgeon-General of the United States Marine-Hospital Service informs me the effect of placing officers of the Service on our transports would be, if no communication is held between the transport and the shore, as above indicated, and no yellow fever breaks out on board en route to the United States, that disinfection of the transport on arrival will not be required.

The present working of the quarantine laws prevents our unloading any transports coming from Santiago at Fortress Monroe without first being quarantined; to avoid which we are ordering the transports, as rapidly as they arrive at Fortress Monroe, to New York. This condition exists as well at Tampa, where all our vessels coming from Santiago are being quarantined.

Very respectfully,

R. A. ALGER,
Secretary of War.

The SECRETARY OF THE TREASURY.

TREASURY DEPARTMENT,
Washington, D. C., August 3, 1898.

SIR: I have the honor to acknowledge receipt of your letter of July 30, requesting that medical officers of the Marine-Hospital Service be detailed at Santiago, and subsequently at Cuban and Porto Rican ports under control of United States forces, to carry out the requirements of the quarantine law of 1893; and also that the transports belonging to the United States, and their crews, be placed under the supervision of sanitary inspectors of the Marine-Hospital Service in order that no material or persons may be taken aboard at the foreign port liable to convey yellow fever, all with a view to prevent the introduction of yellow fever into the United States, and also to prevent the transports themselves becoming

infected, and thus subject to unnecessary delays due to quarantine restrictions at ports of the United States.

In reply, I have to state that I have approved the recommendations made in your letter, and have directed the Surgeon-General of the Marine-Hospital Service to take necessary measures for carrying them into effect.

Respectfully, yours,

O. L. SPAULDING,
Acting Secretary.

The SECRETARY OF WAR.

OFFICIAL ORDERS—WAR DEPARTMENT.

ADJUTANT-GENERAL'S OFFICE,

Washington, August 11.

COMMANDING GENERAL UNITED STATES FORCES,

Santiago de Cuba.

The Secretary of War directs that the following instructions be sent you:

That medical officers of the United States Marine-Hospital Service be immediately detailed for duty at Santiago, and subsequently at other Cuban or Porto Rican ports under control of the United States forces, to carry out the requirements of the quarantine law of 1893: such officers to issue certificates and perform other duties of sanitary or other port inspectors.

That all sanitary matters pertaining to the condition of transports and crews be placed under the jurisdiction of the medical officers of the United States Marine-Hospital Service. Every vessel engaged in the transport service between the United States and Cuban or Porto Rican ports to carry a medical officer of the Army or of the Marine-Hospital Service, whose duty shall be that of sanitary inspector of the vessel, and who shall see that in a foreign port no material or person is taken aboard liable to convey yellow fever; to keep the crews of the transports under surveillance, and on the return voyage act as sanitary inspector.

That there be placed at Santiago and every chief port where practicable a receiving ship for the reception of those who take passage for ports in the United States. This ship would be practically a detention camp and quarantine station, and passengers seeking homeward voyage would be taken from this vessel after they had undergone a period of observation and disinfection of their effects.

Surgeon Carter, United States Marine-Hospital Service, has been appointed sanitary inspector at Santiago.

H. C. CORBIN, *Adjutant-General.*

In accordance with the above correspondence Surgeon Carter was ordered from New Orleans to Santiago, but on the eve of his departure it was necessary to recall the order on account of the yellow-fever situation in Louisiana, the Service in the meantime being represented at Santiago by Sanitary Inspector Caminero, who returned to Santiago July 19 from Kingston, Jamaica, under Bureau orders.

A yellow-fever expert was also ordered to Ponce, but owing to the gravity of the yellow-fever situation in Mississippi his detail was temporarily suspended.

MEDICAL OFFICERS, MARINE-HOSPITAL SERVICE, DETAILED TO SERVE
ON ARMY TRANSPORTS.

Pursuant to the request of the War Department, the following-named officers were detailed for duty on the several transports:

Asst. Surg. A. R. Thomas, transport *Obdam*; Asst. Surg. Sherrard

Tabb, transport *Manitoba*; relieved by Asst. Surg. C. H. Lavinder, in turn relieved by Asst. Surg. L. L. Lumsden; Asst. Surg. John McMullen, transport *Mississippi*; Asst. Surg. S. B. Grubbs, transport *Chester*; Asst. Surg. H. B. Parker, transport *Minnewaska*; Acting Asst. Surg. J. S. Hough, transport *Roumanian*; Acting Asst. Surg. T. D. McClintic, transport *Port Victor*; Acting Asst. Surg. Maxime Landry, transport *Berlin*.

The following instructions were issued:

INSTRUCTIONS TO MEDICAL OFFICERS OF THE MARINE-HOSPITAL SERVICE ON
BOARD TRANSPORTS OF WAR DEPARTMENT.

WASHINGTON, D. C., August 3, 1898.

- (1) Your duties are primarily to keep the transports from becoming infected.
- (2) At the foreign port the crews must be forbidden and prevented from going ashore; everything brought on board from shore must be inspected, and if doubt exists, rejected or disinfected. All persons coming on board at foreign ports must be inspected at the gangway. Vessels must lie off the shore and not go to dock.
- (3) Certificates from medical officers of the Marine-Hospital Service on duty at Santiago and other ports should be accepted.
- (4) If troops are brought on board, obtain certificate from responsible medical officer of the Army of freedom from infection.
- (5) No passengers should be allowed on board except on written order of the Commanding General (see correspondence on this subject with War Department, copy herewith inclosed).
- (6) If transport brings back sick or wounded soldiers, the latter are under the care of the medical officer of the Army detailed for this purpose. For their treatment, medical supplies, etc., the Medical Department, United States Army, is responsible. The crews of the vessels, however, are under your professional care, and a supply of drugs, etc., has been sent you for this purpose. If, however, you are called on by the proper authority for assistance of the sick or wounded soldiers, you are authorized to render it. In absence of a regular medical officer of the Army, you will, of course, render such assistance as the ordinary dictates of humanity demand.
- (7) Look carefully after water supply. Keep accurate notes and furnish such certificate as you are able to give to the quarantine officer at the port of arrival in the United States. Transmit reports to Bureau on arrival in home port.
- (8) A copy of the quarantine regulations is sent you herewith for your further guidance, and your attention is particularly called to pages 160 et seq. of the work on yellow fever recently issued by the Bureau.
- (9) At Santiago and other ports you will communicate with the medical officer of the Marine-Hospital Service in command, and will receive and obey any reasonable order from him.
- (10) Disinfectants will be furnished from the Bureau on requisition as soon as practicable, but if for any reason purchase is necessary, the officer may purchase in accordance with the regulations of the Marine-Hospital Service.
- (11) These instructions will be amended or added to hereafter, and if for any cause it is impracticable or impossible to enforce them, the officer must carry out their spirit, if not their letter, to the best of his ability and report the facts to the Bureau.

WALTER WYMAN,
Supervising Surgeon-General U. S. M. H. S.

At the date of this report this arrangement is still in force, and the value of the services of these officers may be judged by the reports thus far received, as follows:

REPORTS OF SERVICE ON THE UNITED STATES ARMY TRANSPORT OBDAM.

By Asst. Surg. A. R. THOMAS.

STEAMSHIP OBDAM, *New York, N. Y., September 8, 1898.*

SIR: I have the honor to make the following report concerning the recent trip of the steamskip *Obdam* from Newport News, Va., to Ponce, Porto Rico, and thence back to New York City. As stated in my last report, we left Newport News on August 18, and arrived off Charleston, S. C., on the morning of the 20th, and took on additional stores and passengers. On leaving there we had about 50 cabin passengers and 110 troops. Three enlisted men were sent ashore in Charleston because of sickness. I either saw them myself or had one of the contract surgeons do so, using the medicines supplied by the Bureau. We arrived in Ponce on the 25th of August, having had no serious sickness and no deaths. We were boarded by the port quarantine officer, who is a Spaniard, still holding the position he did under Spanish rule. Orders were given prohibiting the crew from going ashore, but there was pretty free communication between the boat and the shore. In consultation with Colonel Greenleaf, of General Miles's staff, surgeon in chief of the Army, I learned that there were no contagious diseases among the United States troops in Porto Rico and, as far as known, no yellow fever in the island of Porto Rico. There were a few scattered cases of smallpox among the natives of the interior towns, but none had occurred among the troops. We were also visited by the Army sanitary inspector, who examined particularly the availability of the ship for transporting convalescents. * * * She was unloaded as rapidly as possible, native stevedores being used. An effort was made to have the sanitary apparatus of the boat put in order, but no plumber was available for the purpose. We left the port of Ponce on September 1 and arrived in New York Harbor on the morning of September 7. We had on board General Miles and staff and the two battalions of the Second Wisconsin Regiment of Volunteers, with their officers, a total of about 900. At the request of Colonel Greenleaf, I looked after such of the cabin passengers as needed medical aid, and he turned over his medicine to me for that purpose. The troops were in charge of the regimental surgeon. No serious illness occurred during the voyage, either among passengers or troops or crew.

Each day during the voyage I have inspected the entire ship, usually in company with the captain and one or more ship's officers, and frequently with one or more army officers. During the outward voyage the troops were in many small detachments, with no central head, and it was only with difficulty they could be made to keep their quarters in good condition. On the return voyage there was the greatest difficulty in having the quarters occupied by the troops properly policed and cleaned. Eventually it was necessary to carry the matter to headquarters, and after that it was effectually accomplished.

The water supply throughout has been good. The *Obdam* has a distilling plant capable of supplying 3,500 gallons of aerated water per day, so that there has been an abundance at all times. The sanitary arrangements of this boat are old and worn out, and have frequently needed repairs, causing a great deal of annoyance and inconvenience. In consultation with Colonel Greenleaf I have recommended that the whole plumbing of the boat be thoroughly overhauled before she again leaves port, and I think this will be done. The food supply has been only fairly good, due largely to the fact of the supplies being bought in great haste at Newport News. The ship has an efficient cold-storage plant, operated by compressed air.

As stated above, there is no known yellow fever in Porto Rico at the present time, but it was reported to me that there are always more or less cases in San Juan city, but I could not verify the statement. If the island should become infected it would be extremely difficult to prevent infection of a transport loading or unloading at the port of Ponce if native stevedores are employed.

The instructions received from the Bureau have been carried out as carefully as possible. All troops were inspected at the gangway, unless loading by two gangways at once. No supplies were brought back from Porto Rico except personal baggage and rations. Certificates were obtained from the medical officer of the Second Wisconsin, and my certificate of the condition of the transport was accepted at quarantine in New York.

In conclusion, I would say that if possible the sanitary inspector's position aboard a transport should be more accurately defined, and some power given him to enforce his sanitary measures.

The report of sick treated during the month of August will be forwarded as soon as I can gain access to an official nomenclature.

Yours, respectfully,

A. R. THOMAS,

Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE HOSPITAL SERVICE.

STEAMSHIP *OB DAM*,

New York City, October 20, 1898.

SIR: I have the honor to make the following report concerning the recent voyage of the United States transport *Obdam* from New York to Porto Rico and Santiago de Cuba and return. The *Obdam* left her dock on the night of September 14, having on board one battalion of infantry, with officers, including the lieutenant-colonel of the regiment, in charge, and about 20 cabin passengers and a crew of 70 men. She carried a large amount of supplies, a considerable amount being stowed on deck, and making the washing of decks much more difficult. Upon our departure it was suggested to the commanding officer of troops that it was advisable that the quarters occupied by the men should be policed and thoroughly cleaned each day, and that guards be placed at the fresh-water faucets to prevent waste, and also at the water-closets. Orders were accordingly issued to this effect by the commanding officer, but owing to lax discipline were carried out in a very indifferent manner, and it became necessary each day to remind the officer of the guard of the absence of guards or failure to put quarters in order. As a result, at one time the water supply was rather short, due entirely to wastefulness, inasmuch as the distilling plant on the *Obdam* is amply sufficient to produce all the fresh water necessary for ordinary purposes. There was very little sickness during the voyage and the food supply was abundant and good. The *Obdam* arrived at San Juan, Porto Rico, and was boarded by the pilot, who reported to United States representatives in the city, and that no one could be put ashore previous to the visit of the Spanish health officer. It was therefore decided to proceed at once to Ponce, and she reached that port on September 22. Previous to entering port at Ponce it was suggested to the quartermaster, captain of the *Obdam*, and to the commanding officer of the troops that no unnecessary communication be allowed between the ship and the shore until the status of yellow fever in the city could be ascertained. We were boarded by the Spanish health officer and given pratique. He could give no definite information regarding the health of Ponce, and as soon as possible I reported to the surgeon in chief on General Henry's staff, Major Snowden. He stated that there had been four cases of yellow fever in the general hospital—one death and three recoveries. All were from one regiment and from a guard that had been placed in the prison where

some sewer pipes were being repaired. They had been isolated and their effects disinfected, and quarantine against the town had been raised. He reported two cases of smallpox—one in the general hospital and one a native. It was therefore decided that there was no reason why the *Obdam* should quarantine against the shore.

September 23 Major Seaman inspected the *Obdam*, to ascertain its capacity for carrying convalescents. In conversation he stated that, as a member of the board of investigation into the cases of supposed yellow fever, he did not think there had been a single case of that disease in the city of Ponce. For two days after arrival at Ponce there was a steady downpour of rain, and the troops could not be disembarked. As soon as they had left the vessel the quarters were thoroughly cleaned and scrubbed and put in as sanitary a condition as possible.

While at Ponce three of the ship's crew were sent to hospitals on shore. Third Officer Robbins was knocked from the deck to a lighter below by a boom swing and sustained a fracture of the skull. He was sent to the general hospital next day. Two of the crew were sent to the quartermaster's hospital suffering from malarial fever.

September 27 about 238 convalescents and 40 cabin passengers came on board and the vessel left the next day for Santiago de Cuba. The convalescents were under the medical care of Surgeon-Major Seaman and Assistant Surgeon Jorrel, and Lieutenant Johnson, of the Nineteenth Infantry, looked after the discipline of the men, which was most excellent. The quarters were invariably kept in good sanitary condition and guards were rigorously maintained.

The *Obdam* reached Santiago the evening of September 30, and anchored in the harbor about 1 mile from shore.

During the voyage from Ponce I drew up a set of regulations regarding the conduct of the vessel at Santiago, in order to prevent every possibility of infection, and a copy of the same was given to Captain Allen, quartermaster, in charge of the boat, and also a copy to Major Seaman, at his request. I inclose herewith a copy of the same. Captain Allen assured me that, with the exception of the employment of native stevedores, he saw no reason for not carrying out these regulations.

We were visited early on the morning of October 1 by Dr. Caminero as health officer of the port. He stated that there was very little yellow fever at Santiago, and that it was confined very largely to the troops encamped outside the city. There was, however, great diversity of opinion among the officers in the city as to this question, and I saw no reason to modify my request regarding the isolation of the *Obdam* from shore communication. It was at first stated that we were to take on board all those who wished to go, but a very vigorous protest was made against such action, inasmuch as the convalescents aboard would be especially liable to infection in their present weakened condition. At first it was stated by the depot quartermaster that he would put whomsoever he chose aboard; but by appealing to the surgeon in chief and to General Lawton this was so modified that only those were sent aboard who were obliged to go at an early date, and no one was included who would be liable to carry infection. About 15 passengers were, however, taken aboard, all stating that they had not been in contact with yellow fever, but it was found during the voyage that these statements were not always quite accurate. Dr. Horord, surgeon in chief to General Lawton, issued a certificate stating that all passengers sent aboard were free from infection, and gave verbal orders to me to admit no one whom I thought suspicious. It was difficult to enforce this order, because I had no authority to prevent the officers from boarding if they brought orders from the depot quartermaster.

During our stay in Santiago harbor, most of the cabin passengers were granted permission to go ashore, and a considerable number visited the ship from shore. None of the crew, so far as I know, were ashore in Santiago, however. Native

stevedores were put aboard for unloading the cargo and were everywhere about the ship, mingling freely with the convalescents. I do not see how it is possible to prevent this under the present system.

We sailed from Santiago on the evening of October 2, but were obliged to put back next day because of fire in the coal stored in the hold as ballast. Also during this second visit to Santiago harbor about 20 discharged men were allowed to visit the city for rations. I suggested that some one person should be commissioned to do this duty, but I was overruled, and each man was allowed to obtain his own supply of food.

We left Santiago finally on October 6 and reached New York Harbor on the evening of October 11. During the voyage one death occurred, the man being found at night dead on the deck. One case of pneumonia developed and was convalescent on reaching port. During the trip from Ponce to New York I not only treated the crew but also the cabin passengers, Major Seaman denying any responsibility for any but the convalescents.

Twice during the voyage I made sick call for the medical officers, because of their sickness. Upon reaching quarantine at New York Harbor orders were received to wait at that place for disinfection, but it was the intention of the quartermaster at New York to take off all passengers and their baggage. It had been reported that there had been a case of smallpox on board. Upon my statement that I considered the vessel as free from infection, and therefore in no need of disinfection, she was allowed to proceed to the city.

During the entire period of absence from New York I made a personal inspection of the vessel each day in company with the ship officers, and one of the officers in command of troops if possible. * * * All passengers were discharged on October 12 and the vessel put into dock for repairs. The crew were discharged, and only guards and workmen remained aboard.

The trip as a whole was unsatisfactory, because I could not feel that the ship was free from the danger of infection.

Respectfully, yours,

A. R. THOMAS,

Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

[Inclosure.]

STEAMSHIP OBDAM, *September 29, 1898.*

SIR: I have the honor to make the following suggestions concerning the conduct of this vessel while in Santiago Harbor, in order to conform to the quarantine laws of the United States against yellow fever:

First. The vessel should lie at anchor in the harbor and not at the dock.

Second. There should be no direct communication with the shore, i. e.: (a) Passengers bound for New York and the ship's crew should under no circumstances leave the boat. (b) No persons from shore should be allowed to visit the ship, and, if possible, the cargo should be unloaded without employing native stevedores. (c) Those officers having business ashore should attend to it between the hours of 9 a. m. and 4 p. m., and not remain ashore at night. (d) No passengers should be taken aboard at Santiago. (e) No supplies or freight should be brought aboard unless previously disinfected. (f) Trafficking with "bumboats" should be prohibited.

Yours, respectfully,

A. R. THOMAS,

Assistant Surgeon, M. H. S.,

Sanitary Inspector Steamship Obdam.

Capt. WALTER ALLEN,

Assistant Quartermaster, U. S. A., Steamship Obdam.

REPORT OF SERVICE ON THE UNITED STATES ARMY TRANSPORT MANITOBA.

By Asst. Surg. C. H. LAVINDER.

EGMONT KEY, FLA., September 21, 1898.

SIR: Having complied with your telegraphic instructions of August 2, directing me to report aboard the U. S. transport *Manitoba*, at Newport News, Va., to serve as sanitary inspector and ship's surgeon aboard that vessel on a voyage to Porto Rican or other ports, I have the honor to make the following report:

Upon the receipt of your telegram I proceeded at once to Newport News, and having reported to the proper officers, I was assigned quarters aboard the transport. I had been informed that my full instructions would meet me at this port. These were received after some delay, as well as the box of medical supplies shipped me from the Bureau. The formaldehyde, autoclave, and disinfectants (of the shipment of which I had been advised) arrived too late, and I left without them. My medical supplies proved insufficient, and I was compelled to supplement them by purchases in Ponce, Porto Rico.

We sailed on August 5, and after a notably calm and uneventful voyage reached the Porto Rican coast, off Ponce, on August 10. In attempting to enter the harbor the vessel went aground, and so remained until the 14th, when the efforts to get her off were finally successful. She was very little damaged, and at once steamed to her anchorage inside the harbor. No sickness of a serious nature occurred during the voyage to Ponce except one case of typhoid, which developed on the 10th and was transferred ashore on the 14th.

The *Manitoba* (transport No. 23) is a four-mast, schooner-rigged steamship of 3,604 registered tons (formerly of the Atlantic Transport Line), built to carry passengers, cattle, and cargo. She has, besides her saloon deck, four other decks and a large hold. Some alterations were made in her after her purchase by the Government, notably putting in blower engines and building a number of fan shafts in various parts of the vessel below decks; covering the iron decks (which the troops occupied) with a tongue-and-groove flooring, and placing stanchions and hooks on these decks for hammocks; putting in trough water-closets, stationary tubs, etc. The ship generally, so far as hygiene and comfort are concerned, was certainly above the average of the transports I have seen. The most glaring defects were leakage around the fan shafts where they penetrated the decks, from lack of tight fittings at these places, with consequent wetting of various places on the lower decks and discomfort to those occupying them; the inadequacy of the trough closets for the number of troops, requiring constant and rigid inspection and cleaning to keep them in a decent condition; the filth-accumulating spaces formed by the tongue-and-groove flooring above referred to, laid over the iron decks, necessitating the tearing out of this flooring when cleaning ship. As these over-decks were worse than useless, they were not replaced. We carried on the voyage to Ponce 800 horses and mules and about 750 troops; also a large cargo of quartermaster and commissary supplies.

Upon our arrival in port the troops and animals were rapidly disembarked. The cargo, however, was discharged very slowly, and the work was not completed until a day or so before sailing for New York. Indeed, a portion of it was never discharged, and was brought back to the United States. The various parts of the ship were thoroughly cleaned and whitewashed as rapidly as emptied. The slow discharge of the cargo and the necessarily frequent shifting of the same rendered any systematic cleaning of the ship difficult and unsatisfactory.

On August 24 we sailed, under orders, for the port of Mayaguez, arriving there the same day. A portion of our cargo was discharged here, and on the 31st we returned to Ponce, carrying with us ten passengers. They all left the ship at Ponce.

Ponce and Mayaguez were the only two ports visited during the entire voyage. As soon as possible after our arrival at Ponce I went ashore to see the medical officer in command at that port (Colonel Greenleaf, United States Army). He informed me that both the Port of Ponce and Ponce itself (3 miles inland) were entirely free from any quarantinable diseases, except two or three isolated cases of smallpox. The health of these places he declared to be generally good, with the exception of typhoid among the troops. In Mayaguez, I was informed by the medical officer in command there (Major Eagan, United States Army), upon my arrival, that the health of this port was good and no quarantinable disease existed. Two days later, however, I learned indirectly that he had placed the military hospital and one camp in quarantine. On calling to see him at the hospital, I learned that he had had a death in a patient from one of the camps near Mayaguez, which he considered slightly suspicious as regarded yellow fever, though he admitted that his quarantine was really an extraordinary precaution under the very small suspicion that he entertained. From his description of the case it did not seem to be yellow fever to me. No autopsy was held. The man was hurriedly buried, all of his effects burned, and the room he occupied disinfected. I also saw the local physician, who, as an acting assistant surgeon, United States Army, had charge of the camp from which the case came. He had treated yellow fever on several occasions, and in his opinion that man did not have yellow fever. He also said the man had been sick many days before he sent him to the hospital. Later I saw, in the military hospital, with these two gentlemen, a similar case. I have no hesitancy in declaring it not to be yellow fever. As there were no further developments, and as we remained until quarantine was raised, Major Eagan gave me a clean bill of health for the port. I likewise obtained a clean bill from the health officer of the port. Until the matter was cleared up, however, I recommended that as little communication be held with the shore as possible, and this in the daytime.

The quarantine restrictions in the two ports visited were apparently very lax indeed, and no systematic boarding of vessels was done at either place. The general health of both places was good and the places themselves fairly clean. Their water supply was good, but its sources, so I was credibly informed, open to infection.

We returned to the Port of Ponce on the 31st, carrying with us the ten passengers above referred to. These were composed of officers, soldiers, and residents of Mayaguez. All left the ship at Ponce. I obtained certificates for only two of them, and these were discharged soldiers from the camp which had been quarantined.

On our return to Ponce unloading and cleaning ship continued slowly for some days. Suddenly orders were issued to prepare to return with troops. The remaining cargo was rapidly discharged, troops hurried aboard, and on the afternoon of September 7 we set sail for New York. We carried about 1,450 troops (Sixth Regiment Illinois Volunteers and Danville battery Illinois Volunteers). Our hurried departure, the reason for which I could not discover, gave little time to prepare for the reception of so many troops and caused considerable confusion. We called by Mayaguez the next morning for ice, remaining there only a brief while. One Army officer and three soldiers came aboard here also for transportation to the United States.

On the return voyage several cases of fever developed among the troops, which neither the Army surgeons nor myself considered suspicious. Also one case of measles. All were treated in the sick bay, which had been prepared on the main deck aft. After a fairly smooth voyage of five and a half days we arrived off the New York Quarantine Station on the afternoon of September 13. We were promptly boarded by the health officer of the port (Dr. A. H. Doty). He inspected no portion of the ship except the sick bay and desired no certificate from me

except the urinary analysis of all cases in the sick bay. We were allowed to proceed. The same afternoon we went alongside the Weehawken dock and by the next afternoon all troops, except the sick, were disembarked and put aboard train for home. The sick were taken to one of the New York City hospitals.

I was instructed, among other things, to look carefully after our water supply. We took water twice—first from the steanship *Maverick*, a vessel in the governmental service, formerly in the service of an oil company. This water came from the city waterworks in Savannah, Ga. This was good water and free from any danger of infection. Our second supply came from Ponce. It was brought alongside in large open iron lighters and pumped into our tanks. It was very muddy, and as I did not like the means of transportation I asked that it be put in separate tanks and used for drinking purposes only in case of necessity. I was assured this would be done, but in less than twenty-four hours I found it on the table. A protest apparently stopped its use.

The first part of paragraph 2 of my instructions—"at a foreign port the crew must be forbidden and prevented from going ashore"—I found impossible to obey. All shore leave was refused the crew and an attempt was made to keep them aboard. I soon discovered, however, that many of them were getting ashore. On my making a protest to the captain he stated that he could not keep so large a crew aboard ship without a guard. I then tried to compromise on granting only brief day shore leaves. This likewise resulted in failure. The crew communicated freely with the shore. It would probably have been wiser to ask for a guard, though I doubt if one could have been obtained under the conditions. I am satisfied that without a large guard the crew could not have been kept aboard; still I am equally satisfied that no very virile attempt was made to keep them aboard.

I was also instructed to obtain for all troops who came aboard a medical certificate of their freedom from infection, signed by responsible officers, and for all passengers an order from the commanding general. This I found in some cases very difficult, and in a few impossible. For most of the troops it was easy, as their medical officers accompanied them, but for small detached bodies of troops or individuals (as convalescents from other regiments or discharged soldiers) it was often impossible. These men were detached from their regular commands and often came from camps some miles in the interior, and as most of them came aboard late, only a few hours before sailing, it would have meant a delay of two or three days in sailing or a refusal to take them. As I had made diligent inquiry everywhere and from many men (medical and otherwise) from various parts of the island and could learn of no yellow fever whatever, and as I had clean bills of health from all ports visited, both from the port health officers and the army medical officers in command at these places, I deemed a request that necessitated such inconvenience or hardship unnecessary. I was satisfied, moreover, that any such request would not be honored. These facts were all made known to the quartermaster in charge of the vessel (Capt. H. F. Aspinwall), who proved himself very kind on all occasions in assisting me in the discharge of my duties.

With the very few passengers I encountered similar difficulties. The difficulty of obtaining these certificates was greatly increased by the total ignorance on my part as to when troops would come aboard and from where, as well as by their hurried embarkation. It has seemed to me that a great deal of confusion and annoyance could be saved if the various commanding officers of the Army were informed of the necessity of these certificates and were instructed to have all troops bound for home supplied with them.

I was also instructed to inspect all men and baggage at the gangway as they came aboard. Owing to their embarkation in so hurried a manner and at such inopportune hours (many at night), without any previous notification as to the probable time of their arrival, this was rendered impossible for all troops coming aboard. Most of them were, however, inspected at the gangway.

Protests about these matters met with scant attention very often, as all Porto Rico was declared free from quarantinable diseases, and any precautions requiring much inconvenience were considered both unnecessary and severe. I explained the situation at all times to the quartermaster in charge of the ship and informed him that such neglect might be fruitful of trouble on our arrival in the United States. With this I had to be satisfied.

In the discharge of my duties as ship's surgeon I treated a number of cases, mostly of a minor nature, among both the crew and the troops. My attendance on the troops was occasioned by the fact that after their disembarkation a large guard was left aboard for some time without a medical officer. I also treated one or two patients among the crew of transports anchored near us, they having no surgeon aboard and finding it very difficult to obtain medical advice from the shore. Of this number I lost one case, of typhoid, aboard the transport *Alamo*. He was almost moribund when I first saw him.

Very respectfully,

C. H. LAVINDER, .
Assistant Surgeon, M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT OF SERVICE ON THE UNITED STATES ARMY TRANSPORT MANITOBA.

By Asst. Surg. SHERRARD TABB.

NEW YORK CITY, *October 29, 1898.*

SIR: I have the honor to submit the following report:

In obedience to telegraphic orders from the Bureau, dated October 4, 1898, I proceeded from Delaware Breakwater Quarantine Station to New York and reported to Colonel Kimball, depot quartermaster, United States Army, who at once assigned me to duty as sanitary inspector of the steamer *Manitoba*. I called on Surgeon White and received vaccine virus and letter of instructions and then went aboard the *Manitoba*, where I found the medical supplies sent from the United States Marine Hospital at Staten Island.

When I joined the vessel she was expected to sail at 3 p. m. October 5, and was taking on necessary stores, so there was no opportunity to thoroughly inspect her. Sailing orders were postponed several times until the night of October 6, when the steamer left for Newport, R. I., to take aboard the Forty-seventh New York United States Volunteers.

At Newport I carefully inspected the vessel, and finding her wells aft to be very foul, had them pumped out several times and flushed with carbolic acid, 20 per cent. The boat was as clean as it was practicable to render her without extensive alterations and repairs. Before embarkation of the troops I saw the colonel commanding, and reported to him verbally the condition of the vessel. I also made recommendation as to the precautions necessary to keep the vessel clean during the voyage, and my instructions were faithfully followed. At Newport one of the stewards developed remittent malarial fever, and was sent to the Marine-Hospital officer at that port.

I requested the reservation of two rooms as sick bays, one for the passengers and crew and one for the troops. But the passengers and officers occupied so much space that only the smoking room was available. This was used for this purpose by all aboard. I established office hours—9 a. m. and 4 p. m.—which were kept at the sick bay, and at other times I responded to any calls made on me. I also inspected the vessel daily.

The outward voyage was without incident, except one case of catarrhal appendicitis in a soldier (who recovered sufficiently to go ashore), and minor injuries and sickness among passengers and crew. The vaccination of all troops was com-

pleted by their surgeons before arrival in Ponce, and I vaccinated some of the passengers and crew.

At 6 p. m. October 15 we arrived at Ponce. We were not boarded by the quarantine officer. Communication with shore was limited, and the health of all on board remained good with the exception of two cases (one of ascites, due to cirrhosis of the liver, and the other remittent malarial fever). The ascites case was sent ashore to the hospital.

I saw General Henry, commanding district of Ponce, and reported that the ship required thorough mechanical cleansing before it would be safe to embark troops, and he assured me that no troops would be placed aboard until I was satisfied that the vessel was clean. The ship's crew at once began cleaning her, and were later assisted by 100 natives. The decks were all scrubbed, dried, and whitewashed. The bilges were pumped out, cleaned, and then flushed with 20 per cent carbolic. On October 18 Dr. Ames, acting as inspector of transports, came aboard, and together we went over the vessel. His recommendations and suggestions were in entire accord with my own.

On October 21 the work was completed, and we at once took aboard the Third Wisconsin, United States Volunteers, and such passengers as were sent by the general commanding. On arrival in Ponce I had repeated my request to the quartermaster, United States Volunteers, in charge of the vessel, that two rooms be reserved as sick bays, adding that, if necessary, all unnecessary passengers should be refused passage to make the requisite room. This was not done.

Among the discharged soldiers sent aboard was one man suffering from chronic inflammation of the intestines. This patient was kept in the sick bay during the voyage and sent to Bellevue Hospital on arrival in New York.

The same advice about the care of the troops was given the colonel commanding the Third Wisconsin as had been given the colonel of the Forty-seventh New York.

I completed the vaccination of passengers and crew, meeting with much unwillingness to allow its performance, and having to report the matter to General Henry in order to compel it.

Before leaving I called on Dr. Gaudin, United States quarantine officer, and received a bill of health for the vessel. He informed me that most of the transports did not clear through him and that he had reported the fact to Washington. While the city of Ponce and port of Playa are free from contagious disease, there are 12 cases of smallpox in the pesthouse just beyond the city limits. These cases have occurred in the district of Ponce.

The home voyage was rapid and without noteworthy incident. I inspected the vessel twice daily. The health of the troops, crew, and passengers was good, there being only 9 sick soldiers—all convalescent and none seriously ill—and 3 sick among the crew—1 case of hernia, aggravated during the trip home, and 2 of diarrhea—all being sent to the United States marine-hospital office on arrival in New York.

At 9 o'clock on the night of October 26 we anchored at quarantine.

In regard to the vessel, I consider her unfit for safe transport service to the tropics in her present condition. She was a cattle ship, with accommodations for 77 passengers. The slope of her decks is very slight, and the cement flooring is worn through in many places; also, the wooden cleats for the cattle are still down, and these conditions allow small pools of water to collect which can not readily be removed, as the scuppers are shallow and insufficient for rapid drainage. One of the most serious faults of the vessel is the water-closet arrangement, both for passengers and troops. This consists of two rooms, with two seats each, for the passengers and officers, and four zinc-lined troughs, in which water is supposed to be constantly running, for use by the troops. Each of these troughs accommodates 8 or 10 men. They are placed forward and aft of midships on each side of the first covered deck. The supply pipes to these water-closets are from a common

source with the pipes for flushing the decks, so that when the decks are being washed the water is cut off from all water-closets, rendering them most offensive, as necessity compels their frequent use at this time. The waste pipes from these closets discharge at least 10 or 15 feet above the water line, and consequently when the gangway is being used or a boat is alongside the water must be shut off from the closets on that side of the vessel or the boat is liable to be spattered with excrement. I noticed the same arrangement in other transports and mentioned the fact to Mr. Clarke, the supervising engineer in charge of the transports.

Another faulty arrangement is the placing of the ice box and butcher's block near one of the water-closets for the troops. The water supply was abundant and good, no drinking water being used except that from Croton Aqueduct. The arrangement of drinking water for troops was crude, consisting of a hog'shead of water in which ice was placed. This tank had no cover and no faucet, the water being dipped out in cups by the soldiers.

The cabin fare was amply sufficient in quantity and variety, but for several days on the out voyage the bread was so poor that it could not be eaten, and twice the meat and fish were spoiled. The cook complained of the flour furnished him. The facilities for cooking for the troops were insufficient, the space available being too small and the boilers not sufficient in numbers or capacity. Also the meat, after being cooked, had to be cut up and served on cracker boxes, there being no table for this purpose.

There was no possibility of the soldiers taking a bath, and the arrangement for even washing their hands was insufficient.

The general plumbing of the vessel was defective. The waste pipes were several times stopped up and much difficulty experienced in freeing them. There were also several leaks which were hard to locate and stop.

The wooden bottom of the ship is damp, and where it covers the ballast tanks coal dust and grain have sifted beneath it, rendering it necessary that all this planking should be removed, the space beneath cleaned, and new planking put down.

I have to state that in an informal talk with Colonel Kimball, depot quartermaster, United States Army, New York, he stated to me that the vessel would be thoroughly overhauled and put in first-class condition before she is allowed to make another trip.

Very respectfully,

SHERARD R. TABB,

Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT OF SERVICE ON THE UNITED STATES ARMY TRANSPORT MISSISSIPPI.

By Asst. Surg. JOHN McMULLEN.

PORT OF NEW YORK, N. Y., *November 1, 1898.*

SIR: I have the honor to submit the following report as sanitary inspector of the United States transport *Mississippi*:

The *Mississippi* left Brooklyn, N. Y., at 4 o'clock p. m. October 9, having aboard the Sixth Immunes, United States Volunteers, consisting of 39 officers and 810 soldiers, and arrived at San Juan, Porto Rico, on the morning of the 15th.

The crew numbered 93. Freight was regimental commissary stores, etc., and 15 horses. There was about 600 tons of fresh water aboard. Prior to sailing the vessel was apparently not in an unsanitary condition.

The enlisted men slept in hammocks swung on the lower decks at a space of about 21 inches apart. The water-closets for these men were four in number on the main deck, two forward and two aft. These consisted of long troughs, zinc lined and about 18 inches in depth, through which water was kept flowing constantly.

I was informed by the major and surgeon of the regiment that no sickness existed at the time of embarkation save two men who complained a little, but no positive diagnosis was made. On the second day out a case of measles developed, which was isolated as well as possible and soon recovered. Two cases of enteric fever were diagnosed by the regimental surgeons en route, and disinfection of stools, soiled linen, etc., was strenuously insisted upon. The major and surgeon assured me that this was always done. Those of the crew who could not show successful vaccination marks were vaccinated.

During the voyage I inspected the ship twice daily, morning and afternoon, and all unsanitary conditions were immediately reported to the quartermaster, with recommendations as to their remedy.

The accumulation of food stuff, vomited matter, etc., on the decks, water-closets, etc., gradually increased during the voyage, as they were but poorly cleaned after being reported.

On reaching San Juan the vessel was anchored in the harbor and the quartermaster informed that the crew should be forbidden from going ashore.

Unloading was effected by means of lighters. The last company of troops not landing until the morning of the 18th, and it being the intention to embark others immediately, the authorities ashore were informed that the ship was very dirty and in an unsanitary condition.

The recommendation was made to General Brooke that the vessel be not allowed to sail until given a thorough cleaning, and that sufficient time be allowed for this purpose after the troops were landed and before others were embarked. The major and quartermaster came aboard and informed me that twenty-four hours would be allowed for cleaning ship, and as many men as the ship's quartermaster needed. As thorough cleaning as possible was done in this time and the vessel was very much improved from a sanitary standpoint, although all recommendations were not carried out on account of lack of time.

The two enteric fever patients were removed to a hospital in San Juan. I was informed by the United States consul and others in San Juan that that town was quite healthy and no yellow fever existed on the island.

About 35,000 gallons of fresh water, which I personally inspected and found to be very good, was taken aboard at San Juan.

The vessel sailed from San Juan at 4 o'clock p. m., October 21, 1898, having aboard the Sixth Massachusetts United States Volunteers, numbering 937—38 officers, 894 enlisted men, and 5 servants—8 passengers and the ship's crew of 93.

Freight was regimental, commissary, and quartermaster stores. The bodies of two soldiers who died of enteric fever in Porto Rico were brought to Boston in metallic cases. No sick were brought aboard, as the hospital ship *Bay State* was in the harbor and took charge of these.

On the return voyage the vessel was inspected twice daily, and usually found in very good sanitary condition, owing to the fact that the soldiers' quarters, which had same arrangement as before, were policed, and they were required by their officers to keep them cleaned, any unsanitary condition being immediately reported to the quartermaster.

Three cases of fever developed during the voyage, which were diagnosed by the regimental surgeons, in which I concurred, as probably enteric fever. With these exceptions the health of all aboard was good.

I inclose herewith the certificate of the major and surgeon of the regiment. The vessel sailed light from Boston to New York, with only the First Maine Heavy Artillery aboard, and arrived here on the night of October 31, 1898.

Respectfully yours,

JOHN McMULLEN,
Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORTS OF SERVICE ON THE UNITED STATES ARMY TRANSPORT CHESTER.

By Asst. Surg. S. B. GRUBBS.

U. S. TRANSPORT CHESTER,

Porto Ponce, Porto Rico, August 20, 1898.

SIR: I have the honor to submit the following report of my duties on board the U. S. transport *Chester* from the date of my last Bureau letter to the present time.

We sailed from New York Harbor, after lying there from Saturday morning, August 6, until Wednesday morning, August 10, at 1.30, delayed mostly by mishaps to the machinery of the ship. The trip was uneventful. I limited my duties to caring for the crew and making informal inspections of various parts of the vessel, especially the living quarters, closets, water plugs, and places liable to become filthy and wet.

For the first day or two the sanitary condition of the vessel was only fair. The forecastle was dirty, the forward sinks stopped up and overflowing, and the excreta of the 220 mules aboard rapidly collecting, as no provision had been made for its removal. It was my endeavor to be accompanied on these inspections by a medical officer of the Army or by the chief officer of the ship, and as our objects were identical these faults were speedily remedied. The men's quarters were policed three times a day; closets were assigned to various companies, and guards placed over these and the water plugs. There was at no time any serious illness aboard. The hospital usually contained from six to eight patients, suffering from gastro-intestinal disturbances, all recovering in two to four days.

Just before arriving at Ponce I sent a written communication to the colonel commanding and to the Army quartermaster, major United States Army, aboard, enumerating the precautions required by the Secretary of the Treasury of vessels in an infected port, and asking that these be observed until it could be definitely ascertained that Ponce and its vicinity were free from cases suspicious of yellow fever.

We were boarded on entering the harbor by Passed Assistant Surgeon Spratling, United States Navy, of the *Columbia*, in charge of the temporary quarantine established by the Navy. From him I obtained a certificate, stating that Ponce and vicinity were free from cases suspicious of yellow fever. The next day I obtained a similar verbal statement from the major surgeon in charge of the post hospital at Ponce. There are over 50 cases of enteric fever in this post hospital, and I understand there are over 200 cases in all the hospitals here. It is claimed that these cases were infected before leaving the United States. Several cases of smallpox have also been reported, but I have not as yet obtained any definite information as to the number of cases or their location.

I yesterday sent a written request to the adjutant-general stationed here to have all the temporary woodwork, placed on board for housing of mules, removed, so the ship could be more thoroughly cleaned before going to Santiago. My letter was indorsed "approved," and by an arrangement with the First Volunteer Engineer Regiment this structure is now being removed.

The question of drinking water has given rise to some trouble. As already reported, the ship's tanks, having a capacity of 19,000 gallons, were filled from the Brooklyn waterworks before starting. The distilling plant aboard, having an estimated capacity of 2,500 gallons a day, kept up the supply. Since arriving in this port it has been the endeavor to thus fill the tanks with distilled water, and so avoid water from shore, but through some fault the water has become salty, so that the men complained, and nitrate of silver test showed a large excess of chlorides.

I have personally examined the plant, its connections, and the interiors of the principal tanks, and find that all the water is boiled, but occasionally some salt

water passes over by a sudden boiling up in the evaporator. I have had the tanks emptied, and examination shows them to have a cement lining, to be clean, and that the last few inches of water are perfectly clear and odorless. The tanks are now being filled up with distilled water, and this will be used entirely if we remain here long enough. I have recommended that shore water be avoided, if possible, owing to the prevalence of enteric fever.

The ship is still discharging cargo, but work of cleaning the vessel has already been begun in the parts already cleared of freight.

Respectfully, yours,

S. B. GRUBBS,

Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

U. S. TRANSPORT CHESTER,

New York, September 10, 1898.

SIR: I have the honor to make the following report of my duties and observations on board the U. S. transport *Chester* since last reporting to the Bureau.

During the last week in the harbor at Ponce the ship was cleaned as follows: Some 12 barrels of mud and débris were removed from the bilges, and the same flushed and pumped out. The hold was swept. Between decks—quarters for troops—were swept and in places scrubbed. Water-closets were scrubbed out and closed. Decks, passageways, and all places lately occupied by mules were scrubbed and painted or whitewashed. The temporary woodwork had been removed, as previously reported. All ice boxes in which meat or vegetables had spoiled were scrubbed with lye and water and whitewashed. The forecastle was cleared of all bedding and dunnage, and bunks, floors, and ceiling scrubbed with soap and water. The outside of the ship was painted.

The Fourth Regiment of Pennsylvania Volunteer Infantry came aboard Wednesday and Thursday, August 31 and September 1, and although I had strongly advised that guards be stationed and policing be begun at once, it was not done, and in a very few hours the closets were filthy and troops' quarters dirty. At my suggestion the regimental surgeon attempted to enforce certain sanitary regulations, but with indifferent success. I accordingly reported the condition to Brigadier-General Schwan, senior officer aboard, who consented to make an inspection with me every morning. By his orders, but only after considerable delay, the ship was gotten in fair condition. The closets in the afterpart of the ship remained in bad condition until I had a temporary wooden sink constructed on deck, flushed by a hose. The closets were then cleaned and closed.

All troops coming aboard were inspected by me at the gangway, and all sick ones further examined, although no attempt was made to prevent them coming aboard. The sick were examined by me, together with the regimental surgeon, and the cases were found to be chiefly malarial fever, dysentery, and effects of exposure. Nothing suspicious of contagion was found, but cases suspected to be enteric fever were advised to go ashore. A certificate was given me by the regimental surgeon stating that none of the troops under his charge had been exposed to any contagious epidemic disease while in Porto Rico.

There was some sickness among the crew, chiefly diarrhea and gastritis. William Dewey, after being ill three days, showed decided typhoid symptoms. He was removed ashore to the United States General Hospital on August 30, and his bunk and vicinity scrubbed with a solution of carbolic acid. On September 3 six of the crew were suddenly seized with violent vomiting, abdominal pains, and diarrhea, ending in partial collapse. All had eaten at breakfast from the same can of corned beef, and I believe these cases to have been ptomaine or similar poisoning.

By the fourth day out from Ponce four of the cases aboard could be positively diagnosed as enteric fever. Two other cases of fever were considered malarial.

Captain Smith, Company K, Fourth Pennsylvania Volunteers, who came aboard suffering from fever, became gradually worse on the voyage; his symptoms assumed a typhoid state, and he died on Monday night, September 5. His clinical history was kept and I had a signed copy handed me. I repeatedly saw him and the other cases and the symptoms were at no time suspicious of yellow fever. His urine was carefully examined with negative results.

On arrival at quarantine I handed the boarding officer a letter stating the sanitary condition of the ship and inclosing a copy of histories of cases aboard. The ship was promptly passed.

The *Chester* left Ponce Thursday, September 1, at 4 p. m., and arrived at the New York quarantine about 2 p. m., Tuesday, September 6. After considerably delay she anchored in the bay and the troops were taken off during the night.

The diseases that came under my observation were chiefly dysentery and enteric fever. These, when combined with a malarial infection, fatigue, and exposure, give oftentimes a complicated and puzzling picture. The dysentery was especially notable for its prevalence and the severity of the intestinal colic accompanying it. On shipboard it occurred among troops, officers, and crew, over one-third suffering from it. The colic was so severe in many cases as to suddenly prostrate the patient by its pain, and sometimes to end in syncope and partial collapse. The cause must be attributed to the food chiefly, as it is the only condition that persisted. The water used, under my observation, was from different sources with no change in number of cases. Again, crew and troops alike suffered, so the climate and exposure can not be the sole cause. The occurrence of apparent ptomaine poisoning of six of the crew would also tend to point to canned food as liable to cause intestinal irritation.

The *Chester* is now at dock at Dow's Stores, Brooklyn, has unloaded, and is preparing for sea.

Respectfully, yours,

S. B. GRUBBS,
Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

U. S. S. CHESTER,
New York, November 5, 1898.

SIR: I have the honor to make the following report of my duties and observations on board the U. S. S. *Chester* during the voyage just completed.

Beyond cleaning and disinfecting (bichloride of mercury) the closets and hospital, which was done under my direction, no improvements were made in the sanitary arrangements of the vessel before sailing, on September 28, 1898, with a cargo of commissary stores and some 300 passengers, chiefly contract surgeons, nurses, and detached details. Owing to the small number of passengers aboard it was possible for the crew to keep the ship in a good sanitary condition on the outward trip, which was uneventful. Before making our first port I addressed a letter to Capt. W. P. Williams, quartermaster, in charge of the ship, stating what regulations were prescribed by the Treasury Department for vessels in ports infected with yellow fever, and requesting that these be observed in each Porto Rican or Cuban port until I could obtain satisfactory assurances that no infection existed at the given port.

The *Chester* arrived at San Juan, Porto Rico, October 4, and was boarded by the post physician, to whom I gave a certificate stating that the vessel was free from epidemic contagious diseases, and in turn he gave me a certificate stating that San Juan and vicinity were free from yellow fever. The mail and some passengers were put off at San Juan, and we left in four hours for Ponce, arriving there the next day. Upon being boarded by the port physician I immediately inquired concerning the reported cases of yellow fever. He stated that while four cases had,

at the time of their occurrence, been considered suspicious, they had recovered and had not been followed by others. I also called upon Maj. D. R. Egan, chief surgeon, at Ponce, who assured me there were not even any suspicious cases in Ponce or vicinity. I consequently notified Captain Williams that precautions could be relaxed, but advised that the crew be kept on board, and that passengers waiting to go to Santiago sleep on board ship.

On the outward trip I took medical charge of all on board at request of the quartermaster in charge, and had but two cases of serious illness—both typhoid fever—one, a Dr. Sears, contract surgeon, just from Camp Wikoff, who came to me the first day out, and William Olsen, fireman, who became exhausted in the fire room the night before arriving at Ponce. Both were removed to hospitals in Ponce the day we arrived.

While at Ponce inspections were held as regularly as possible. All persons coming aboard as passengers were examined. Lieutenant Campbell, First Kentucky Volunteers, who came aboard ill with typhoid fever, was removed to the officers' hospital against his protest. About twenty convalescents of the Sixteenth Pennsylvania Volunteers came aboard. Four had temperatures from 39° to 40.5° C., and were put in the ship's hospital under a hospital steward. One was manifestly typhoid fever and was removed ashore. The others were undoubtedly malaria and were allowed to remain until October 10, when they were removed to the *Minnewaska*, bound for New York.

The *Chester* left Ponce October 13 at 5 p. m. and arrived at Santiago de Cuba October 15 at 6 p. m. I called upon Dr. Caminero, sanitary inspector, as he did not board the vessel, and he assured me there was now no yellow fever among the citizens of Santiago, nor had there been any for two weeks, and he stated that he would give me a certificate to that effect. I then called upon Brigadier-General Wood, military governor, who also assured me that, excepting one camp and the yellow-fever hospital, there was no infection, and at each of these places there had been but one suspicious case in the previous two weeks. I consequently again did not attempt to have regulations enforced, but recommended that all passengers be kept aboard at night, the crew at all times, that no decks be washed or water be distilled while in harbor. These precautions were taken. Fourteen passengers came on board at Santiago. These were inspected by me and their places of residence for the week previous to embarking recorded. In all cases they were places considered to be free from infection. However, I unofficially inspected each of these passengers daily for five days. One—a teamster from the packers' camp—was found on the second day with fever and headache, having had a chill during the night. I felt satisfied, however, it was malarial fever, and so did not isolate the case, and in two days he had recovered under a course of quinine and arsenic.

We left Santiago on October 17 and arrived at Ponce October 20, the ship being swept and scrubbed on the trip over.

On October 22 and 23 the Forty-seventh Regiment New York Volunteers, with their stores, were embarked on the *Chester*, it being the intention to land them at the various points along the coast occupied by the Fourth Regiment Ohio Volunteers, taking the Ohio troops with us. This necessitated loading a great many supplies on the decks, the changing of quarters, guards, and details which, coupled with poor discipline among the men and indifference among most of the officers, soon got the ship in a filthy condition. I soon abandoned hope of preserving the vessel in a sanitary condition, except in the closets, which, by means of getting a detail to clean them and personally directing them, were kept in fair condition. The vessel left Ponce October 23, at 6 p. m.; remained at Arroyo October 24; at Humacao October 25; at the island of Vieques October 26; at Fajardo the morning of October 27, arriving at San Juan the evening of October 27.

The last seven companies of the Forty-seventh New York were disembarked here by October 28, at 8 p. m., and the crew, with details from the Fourth Ohio troops aboard, immediately began cleaning the ship, and during the night all decks, quarters, and gangways were gone over with hose and brooms, after first sweeping. The remaining seven companies of the Fourth Ohio Volunteers embarked October 28, and at 5 p. m. the vessel sailed for New York.

In the case of both regiments inspection at the gangways was impracticable, and in my opinion unnecessary. So instead I obtained from the major-surgeon of each regiment a certificate stating that no epidemic contagious disease existed in his regiment, and that they had not been exposed to any such infection. I also inspected the patients of the Ohio regiment and found them suffering from typhoid, malaria, and dysentery. In none were there any symptoms suspicious of yellow fever.

On October 31 about 1 a. m. Avery Vertner, Company K, Fourth Ohio, a convalescent from dysentery of three months' standing, was heard to gasp in his berth in the hospital, and when seen a little later was found dead. The man had been weak, but could get up and attend to himself. It is reported that he had no fever. At my request a necropsy was held, and I report here my personal observations of the salient points: Body much emaciated; no jaundice; considerable ecchymosis in dependent parts of body; rigor mortis moderate: lungs oedematous; heart apparently normal; stomach and duodenum normal and empty; ileum contained some small elevated nodules; large intestine mucous membrane congested and hemorrhagic; liver and spleen somewhat enlarged. Autopsy was held nine hours after supposed time of death. The remains were buried at sea October 31 at 12 o'clock.

On the trip from San Juan to New York as good a sanitary condition was maintained as was possible with the poor facilities the *Chester* affords. As soon as Col. A. B. Coit, Fourth Ohio, came aboard at San Juan I recommended a plan for guarding and policing the ship. It was accepted and in general carried out, and I have at all times been assured of the most hearty support and cooperation in endeavoring to maintain a sanitary condition of the vessel.

The *Chester* arrived at quarantine, New York City, November 3 at 8 p. m., but was not boarded until 10.30 a. m. on account of fog. I handed the boarding officer a statement of the ports made on this voyage, general sanitary condition, and number of sick aboard, with short history of each, signed by Maj. E. M. Semans, surgeon in charge. The cases were inspected and the ship immediately passed. After some delay on account of fog the ship proceeded and anchored off Bedloes Island at 1 p. m.

I have to mention that on this trip the diarrhea, so prevalent on the last trip, has been almost entirely absent. This I must attribute to improved quality of the preserved food stuffs. Again, the great difference of opinion as to the amount of yellow fever in Santiago is very striking. Those speaking most officially say there is little or none, but many medical officers declare there are over 100 cases and have been at one time over 1,000.

When in this port in September I refrained from making any direct recommendation toward improving the sanitary apparatus aboard, preferring to have what was necessary asked for by the chief engineer and first officer. This time, however, I shall, with the Bureau's consent, recommend directly some improvements, especially if the ship is to sail again on next Wednesday, as I understand from Fleet Captain Mason is the intention.

Respectfully, yours,

S. B. GRUBBS,

Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT OF SERVICE ON THE UNITED STATES ARMY TRANSPORT MINNEWASKA.

By Asst. Surg. H. B. PARKER.

U. S. TRANSPORT MINNEWASKA,

October 20, 1898.

SIR: In compliance with telegraphic bureau orders September 3, 1898, relieving me from duty at New York and ordering me to report to Colonel Kimball at the Army Building for assignment as sanitary inspector of the steamship *Minnewaska*, I have the honor to make the following report:

I reported to Colonel Kimball at 3.30 o'clock September 3, and was assigned to stateroom; on Monday, September 5, I received instructions, quarantine regulations, etc., by mail, and three boxes of drugs and disinfectants by express. These articles, together with my baggage, were immediately transferred to the *Minnewaska*.

During the days of September 5 and 6 the ship took on cargo, going to an anchorage in the stream at 9 o'clock September 6. At 5 o'clock next morning vessel sailed for Charleston, S. C. At 9 o'clock a. m. I made an inspection of the boat, in company with the chief officer, and found it to be mechanically dirty on the spar, main, and between decks. All other decks and compartments were filled with forage and sanitary supplies for Santiago. Instructions in writing were given to Captain Gibbon, the navigator, which were immediately complied with, the decks first being swept and then flushed with water from a hose, rendering them thoroughly clean; and as only one compartment was occupied by a small detachment of Signal-Corps men, there was no change from this condition from day to day. All parts of the ship used by the passengers and crew, including the forecastles, were washed with water from the hose once each twenty-four hours.

When entering Charleston Harbor, September 9, a case of catarrhal jaundice came under observation, the details of which I reported at once. The ship was detained at quarantine until the morning of September 14, when she left for Santiago. While in Charleston forage was taken on board.

On inspection on the morning of September 14 all compartments below the spar deck except two aft on the main deck were filled with forage for Ponce, Porto Rico. Of these two compartments, one was used by the Signal Corps; the other was reserved and fitted up for use as a water-closet.

Daily inspections were made until September 18, when Santiago was reached. At all times was the sanitary condition of the ship good, every assistance being rendered to maintain it in that condition. The signal men and passengers were landed September 19, all being in good condition at that time.

According to instructions the ship anchored in the stream, the crew were forbidden to go ashore, and my arrival was reported to Sanitary Inspector H. S. Caminero. The doctor assured me the port was and had been free from infection for some time. Here it was impossible to strictly observe the instructions sent me. About 600 tons of cargo had to be landed; the crew was small and were soon incapacitated by the intense heat, so that about fifty native stevedores had to be employed to assist in working the cargo. They came on board daily until September 27, when the handling of the cargo was finished. Cargo was taken on here; it consisted of ordnance stores in boxes and was placed in compartments of the lower holds.

The ship was to sail at noon on September 27, but was held until some convalescents were placed on board. They were from the officers and the general and yellow-fever hospitals. They were inspected on the gangway, and they presented no evidences of having had yellow fever. Three of them, however, were in a state of collapse, and I protested against receiving them. There were no sick supplies on board, and neither physicians nor nurses had been detailed to care for them. They said they were given twenty minutes in which to prepare for the trip, the most of them being in pajamas. I reported their condition to Major

Wilson, the quartermaster on board, and requested his assistance in having the men removed or having the proper supplies placed on board. I also went to the chief surgeon, Lieutenant-Colonel Havard, and represented their condition to him. He said he could give me what medicines I needed, but he had neither nurses nor physicians to care for them. I told him how they were clothed and asked for clothing of the proper kind, but he said it could not be secured for them. I was, however, given an order to have one patient in pajamas removed, but the physician to whom the order was addressed refused to obey it and returned the order to me. I inclose the order with this report. I was given a certificate that the patients were free from infection. This certificate I inclose with the report.

On returning on board the ship I acquainted Major Wilson of the result of my errand, dwelling particularly on the actual condition of the men and what must be the inevitable result if we left the harbor with the patients in that condition. He suggested a personal call on General Lawton and that evening accompanied me to his residence, where I informed him of what had taken place. He promised his immediate attention in the morning and detailed General Wood to make an investigation and fix the responsibility. General Wood came on board at 8 o'clock a. m. and saw the cases and was told what accommodations we had for them. General Wood's report to General Lawton accused the medical officers in charge of the various hospitals of neglect in sending them on board. As three of them were in a critical condition, it was thought the shock of moving them would result fatally; for this reason they were left on board. General Wood had three nurses and a physician sent on board to attend them and gave an abundance of Red Cross stores and \$20 in cash with which to buy the necessities for their comfort and nutrition. At 5 o'clock that evening the ship sailed for Ponce, Porto Rico.

I have entered into these incidents at Santiago in detail as they conflict with the reports circulated by the press, and I did not wish any misapprehension as to the manner in which I tried to fulfill my duties. We arrived at Ponce on the evening of September 30. During the passage the usual good sanitary system was maintained and some assistance given to the care of the patients. The sickest of the patients had been removed to the smoking room on the promenade deck, and all except one had slightly improved. There were two hospital ships in the harbor, the *Relief* and the *Solace*. I suggested to Major Wilson to try and have our sick removed to one of them. We called on General Henry, and on stating the particulars an order was given to the *Solace* and *Relief* to remove our patients. The *Solace* refused, lest the ship become infected. They were transferred to the *Relief* on the afternoon of October 1.

I received a carboy of formalin from the *Relief* and as a precaution disinfected the staterooms and smoking room and their contents before I gave a certificate that there would be little danger of infection. From this time until October 10 the cargo was removed and all portions of the ship to be occupied by troops thoroughly cleaned by sweeping, flushing with water from the hose, covering the floors with lime, and after twenty-four hours again flushing with water from the hose. In addition to this the forward compartment between decks to be used as a hospital had its sides and ceiling whitewashed.

On the evening of October 10 the troops came on board. They included the following: General Ernst and staff, General Hulings and staff, 3 battalions Sixteenth Pennsylvania Infantry, 125 convalescents of Third Wisconsin, and 20 horses.

It was impossible to inspect them as they came on board on both sides of the ship. They were all in fair physical condition, only 35 being assigned to the hospital compartment. At my request Surgeon-Major Egan prohibited all cases pronounced serious or requiring special treatment from being placed on board. As a result, those sent to the hospital had minor ailments, and nearly all were benefited by the trip. On the morning of October 11 supplies were taken on board, and at 8 o'clock p. m. we sailed for New York.

On the morning of October 12 I conferred with General Hewling in reference to the proper policing of the ship. He appointed five captains on a board to make daily inspections and to whom I could always look for assistance. This arrangement was satisfactory, and during the return trip until October 17 the inspections morning, afternoon, and evening were a repetition. At all times was the sanitary condition good or fair. A word to a captain always produced the desired result when it was thought the condition could be improved upon.

Food supply.—Regular Army travel rations were issued, ten days' supply being placed on board. The quantity and quality were satisfactory.

Water supply.—At Brooklyn, on September 5 and 6, 1,100 tons of fresh water were placed on board. At Charleston 200 tons were taken on for boiler use, and at Ponce 50 tons for the same purpose. The water was excellent at all times, and in abundance.

Air supply.—All compartments occupied by troops were continually supplied with fresh air by means of four large steam fans. There was scarcely a perceptible difference between the air on deck and the quarters when fully occupied.

Water-closets.—The compartment farthest aft on the main deck was set aside for this purpose. The zinc-lined troughs, with narrow bases and sea water flowing through them, were admirably adapted for this purpose. The small urinal troughs on the starboard side of the main deck amidships and the washstands on the troop deck were removed: their presence tended to keep the floors moist or wet.

At the quarantine station, New York, the sick were inspected and found in good condition, save one who seemed quite ill. They were removed to a city hospital in the evening. Transportation was furnished the others to their homes. Disembarkation was completed on October 18. The cleaning process was then again commenced, and all portions of the ship occupied by troops were flushed out with water. On the afternoon of October 19 I completed my inspection by pronouncing the ship mechanically clean.

Credit should be certainly given to Major Wilson, the quartermaster of the ship, and the various officers for the assistance given me in keeping the ship in proper condition. At all times men were at my disposal for any purpose.

Respectfully, yours,

HERMAN B. PARKER,
Assistant Surgeon, U. S. M. H. S.

REPORT OF SERVICE ON THE UNITED STATES ARMY TRANSPORT ROUMANIAN.

By Acting Asst. Surg. J. S. HOUGH.

U. S. TRANSPORT ROUMANIAN,
Manzanillo, Cuba, October 19, 1898.

SIR: I have the honor to submit the following report on the condition of this ship and my services on same:

On October 1, 1898, I reported on board the ship, then at New York, to Capt. Charles M. Wrigley, assistant quartermaster, United States Army, in military command of the *Roumanian*.

Captain Wrigley gave me a very warm welcome. He was regretting having to sail without a surgeon on board, as he did on his former voyage. He said he had noticed the improved sanitary condition of the transports on which surgeons had been placed, and the credit of this improvement he gave to the Marine-Hospital Service. When I explained to him my duties, he assured me of his help and authority to enforce any suggestion or recommendation I should make.

On the morning of October 2 I made a thorough inspection of the ship. The

cabins and saloon were in good condition. The rest of the ship was very dirty, especially the quarters of the crew, both forward and aft. These rooms were so very filthy and foul smelling as to be unfit for use. The water-closets were in the same condition, and one was ordered locked and put out of use.

The crew were immediately ordered to work cleaning ship. They were kept constantly at work, and before we reached Fernandina, Fla., the ship presented another appearance and was in as good a sanitary condition as was possible.

We arrived at Fernandina, Fla., on October 5, and learned that the regiment of troops could not arrive from Jacksonville until the following Monday, October 10, on account of the railroad being destroyed by the recent storm.

While at Fernandina I followed the instructions received and vaccinated all those members of the crew who could not show a recent successful vaccination. This I could not have done without the help of Captain Wrigley, who insisted on the order being obeyed.

The Fourth Regiment United States Volunteer Immunes arrived on Monday, October 10, and immediately came on board. The ship had been coaling several days and finished about noon on the day the troops came. The regiment arrived on board in the afternoon while the crew were still washing the decks, and the ship was somewhat dirty from coal dust.

When the regiment was on board there was a total of 1,052 men on the ship, 972 belonging to the regiment and 80 to the ship. We also took on board with the regiment 95 mules and 20 horses. When I came on board at New York there had been provided, as water-closets for the troops, long tin-lined troughs. Deeming these unsatisfactory and impossible to be kept clean, we had closets rigged out the portholes from the sides of the ship and overhanging the water. While there was no privacy about them, they were, so far as sanitation is concerned, absolutely perfect. They have been eminently satisfactory.

We left Fernandina October 12, at 3 p. m.

I have made daily inspections of the ship with Dr. McGrath, assistant surgeon of the regiment. We were very careful in these inspections, and Colonel Pettit has helped us, by enforcing the most rigid discipline, to keep the ship in good condition. At first we found the troop deck in a very dirty condition and made frequent complaints to the colonel, who in turn would reprimand the captain of the company whose quarters were complained of. As a result each captain voluntarily made an almost hourly inspection of the quarters occupied by his company. A soldier would be arrested for throwing even an orange peel on the deck. After a short period of this discipline we had and preserved throughout the voyage a deck so clean that even on close search we could find not even a scrap of paper to complain about. It is very pleasing and gratifying to know that a ship's deck on which are crowded so many soldiers can be kept perfectly free from dirt. It would have been impossible, however, to accomplish this without such a man as Colonel Pettit in command.

As I informed you in a former letter, the regiment is infected with typhoid fever, contracted at Jacksonville. When the regiment left that city between 20 and 30 cases were left in the hospital. Nine cases developed the first day on board and were left at Fernandina. On the trip to Manzanillo 25 cases of fever developed, most of which have been diagnosed as typhoid fever. A hospital has been established on the ship and is in charge of Dr. Ford, assistant surgeon of the regiment.

The troops will land to-morrow, and as soon as our cargo is put ashore we are ordered to proceed to Porto Rico (Ponce). On the trip I will have the entire ship cleaned and disinfected.

A great measure of the credit for the improved condition of the ship is due to Captain Wrigley. He has always cheerfully acted upon every suggestion I made, and has forced by military authority obedience to my orders.

We reached Manzanillo on the afternoon of the 17th, and were boarded by Dr. Socanas, the local health officer, acting under the authority of the United States Government. I was assured by him that there was no yellow fever here and had had not been the entire summer. I have since verified his statements by inquiries among the leading men of the town and the officers of Colonel Ray's troops now occupying this port. The streets of the city are very clean and well kept, owing, I understand, to the work done under Colonel Ray's orders.

Although the health reports from the city are so favorable, there being even no typhoid and very little malarial fevers, every precaution possible is taken on the ship.

After our cargo is discharged here we will take Colonel Ray's troops to Guantanamo. Before they come on board the ship will be disinfected, and after landing them at Guantanamo we will again disinfect, preparatory to receiving troops at Ponce, Porto Rico.

I shall keep you advised of our actions.

Very respectfully,

J. SPENCER HOUGH,

Acting Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

TEXAS BORDER, INSPECTORS AND GUARDS.

During August, September, and October, on account of the yellow fever being prevalent in Vera Cruz, Tampico, Monterey, and other localities in the Republic of Mexico, special sanitary inspectors and guards were appointed on the Texan border, namely, at Brownsville, Laredo, Eagle Pass, and at El Paso, to enforce the United States quarantine regulations, Article XIII, relating to the Mexican frontier.

The sanitary inspector at El Paso was on duty throughout the year.

ISSUANCE OF TREATISE ON YELLOW FEVER.

In addition to these precautions I had prepared and, with your approval, published a treatise on the nature, diagnosis, treatment, and prophylaxis, of yellow fever and the quarantine regulations relating thereto. This book I distributed widely among sanitarians, health officials, medical officers of the Army and Navy, masters of transports, and others, and many commendatory expressions with regard to it have been received.

This book is reprinted in toto in this volume, under the head of "Contributed articles."

INVESTIGATIONS OF REPORTED CASES OF YELLOW FEVER.

During the summer and fall a number of false reports of yellow fever were investigated in Mississippi and Louisiana. In addition, there was much anxiety regarding certain ports in other States, particularly Florida. About the middle of August, at Key West, a conference of six physicians, including a medical officer of the Marine-Hospital Service and the representative of the State board of health,

as well as a medical officer of the Navy, determined that certain cases of sickness among the marines were yellow fever, and the island of Key West was immediately quarantined by the State health officer pending further investigation. Special precautions were taken by the Bureau to protect the east coast of Florida and prevent infection reaching the military camp at Jacksonville. Special experts of the Marine-Hospital Service were sent to Key West, and after careful investigation they, together with the State health officer, declared the prevailing disease to be dengue, and the quarantine was raised September 8. Port Tampa, on account of the presence of large bodies of troops there with sickness among them, was also the subject of reports which proved to be false.

August 24 a case of yellow fever was reported in the military barracks at Fort Point, near Galveston, Tex. Quarantine was declared by the State health officer, and the troops were removed to a northern point. No other case developed. The history of the investigations at Key West and Galveston may be found in the public health reports of August, September, October, and November, 1898.

On July 10 and 15, 1898, the United States auxiliary cruisers *St. Louis* and *Harvard* arrived at Portsmouth, N. H., with 1,703 prisoners captured at the time of the destruction of the Spanish fleet at Santiago. Four hundred and eighty-nine of these prisoners were sick, some of the cases being exceedingly grave. As they were but five days from Santiago, the nature of the sickness was a matter of grave concern, particularly since the symptoms as reported to the Bureau by Acting-Assistant Surgeon Heffenger, in charge of the United States Marine-Hospital Service at Portsmouth, N. H., simulated very closely those of yellow fever; and particularly since a number of them—the officers—were very shortly transferred to a more southern locality, namely, Annapolis, Md. Pending investigation, all were kept under close guard and observation by the medical officers of the Navy until it was finally demonstrated that there was no yellow fever among them.

On or about July 19 the United States quarantine officer at Fort Monroe (Cape Charles Quarantine) reported a suspicious disease in the army hospital among patients from Santiago. A yellow-fever expert of the Service, Surgeon White, then in Washington, was immediately sent to investigate, and for two days the development of the case strongly indicated yellow fever, and it became necessary to take measures to meet the situation. Other officers were ordered and arrangements made with the Army authorities to transfer all hospital patients to the "Rip Raps," near the entrance to Hampton Roads, but, fortunately the case proved not to be yellow fever.

Other localities requiring investigation were Brownsville, Tex., and Varner, La.

While the investigations as narrated above resulted in negative findings as regards yellow fever—excepting at Fort Point, Tex.—they

are mentioned as illustrating the great vigilance required of the Service. They caused for the time being as much solicitude as though the findings had been affirmative and required the detail of medical officers for investigation and report and preliminary arrangements pending decision. No case of yellow fever gained entrance into the United States from abroad during the period covered by this report, the fever in Louisiana and Mississippi being due to recrudescence of the fever of the previous year.

AMENDMENTS TO QUARANTINE REGULATIONS—QUARANTINE CIRCULARS.

ADDITION TO QUARANTINE REGULATIONS TO BE OBSERVED AT PORTS AND ON THE FRONTIERS OF THE UNITED STATES—DISINFECTION BY FORMALDEHYD GAS.

[Circular.]

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,
Washington, D. C., August 5, 1897.

To National, State, and Local Quarantine Authorities, Collectors of Customs, and others concerned:

Addition is hereby made to the Quarantine Regulations of the Treasury Department, issued April 26, 1894, by inserting under Article V, "Quarantine regulations to be observed at ports and on the frontiers of the United States," paragraphs 8 and 9, as follows:

PARAGRAPH 8.—*Disinfection of steerage, forecabin, and cabin of vessels by formaldehyd gas.*—After the removal of the bedding, carpets, and furnishings, all apertures being tightly closed, the steerage, forecabin, and cabin of a vessel may be disinfected by formaldehyd gas in a percentage of not less than 2 per cent per volume strength, the time of exposure to be not less than twelve hours.

The gas may be generated by one of the following methods:

(a) From methyl (wood) alcohol by means of special lamps, using not less than 600 grams (750 cubic centimeters, $1\frac{1}{8}$ pints) of methyl alcohol for each 25.5 cubic meters (1,000 cubic feet) of space, the time of exposure to be not less than twelve hours. Lamps used for generating formaldehyd gas from methyl alcohol should change not less than 1 liter (1.01 quarts) of the alcohol within an hour.

(b) From an aqueous solution, containing 40 per cent of the gas, known under the names of formalin, formol, or formalose. The gas is best evolved from these solutions by the addition of from 10 to 30 per cent of a neutral salt, preferably calcium chloride or sodium nitrate, and heating the mixture in a special boiler. One liter of a 40 per cent solution of formaldehyd gas will evolve about 1,425 liters (50.1 cubic feet) of gas at 20° C. (68° F.), and will be sufficient for 71 cubic meters (2,505.5 cubic feet) of space.

(c) From the substance known as trioxymethylene by means of a special lamp, not less than 2 grams (30 grains) to be used for each cubic meter (35.23 cubic feet) of space.

After the disinfection of apartment (steerage, cabin, and forecabin) by formaldehyd gas the latter should be neutralized by ammonia gas, evolved from water of ammonia by heat, or by evaporation from water of ammonia sprinkled upon the floor.

NOTE.—The quantity of water of ammonia required for neutralization after each of the above-named methods is as follows: After method (a), 1 liter (1.01 quarts) of water of ammonia for each 1,000 cubic centimeters (1.01 quarts) of wood alcohol used; after method (b), $1\frac{1}{8}$ liters (1.26 quarts) of water of ammonia for each liter (1.01 quarts) of formalin; after method (c), 1 liter of water of ammonia for each 150 grams (5 ounces) of trioxymethylene.

PARAGRAPH 9.—*Disinfection of clothing, bedding, upholstered furniture, articles of leather, etc., by formaldehyd gas.*—These may be disinfected by formaldehyd gas in the ordinary steam disinfecting chamber, the latter to be provided with a vacuum apparatus and special apparatus for generating and applying the gas. The gas should be applied in a dry state in not less than 20 per cent per volume strength, the time of exposure to be not less than one hour. Clothing, bedding, etc., thus disinfected should be exposed in situ to an equal amount of ammonia gas generated by the special apparatus attached to the chamber, using 1 liter of water of ammonia to each liter of formalin; or compressed ammonia gas may be used.

NOTE.—The special apparatus must consist of a generator, constructed of copper, for evolving formaldehyd gas from its solutions, and a similar one of iron for evolving ammonia gas for neutralization. The principle upon which this apparatus is constructed is described and illustrated in Public Health Reports, Marine-Hospital Service, January 29, 1897, Vol. XII, No. 5.

L. J. GAGE, *Secretary.*

ADDITION TO QUARANTINE REGULATIONS—SPECIAL REGULATIONS RELATING TO NAVAL VESSELS.

[Circular.]

TREASURY DEPARTMENT,
Washington, D. C., March 31, 1898.

To Officers of the Treasury Department, State and Local Quarantine Officers, Consular Officers, and Others Concerned:

The following additions to the Quarantine Regulations, to be observed at ports of the United States, are hereby promulgated:

ARTICLE XIII.

1. Such communication may be allowed with vessels of the United States Navy as the certificate of the medical officer of said vessel shows will not be liable to convey infection.

2. The certificates of the medical officers of the United States Navy—that the United States Quarantine Regulations have been complied with may be accepted for naval vessels.

3. Vessels of the United States Navy, having entered the harbors of ports infected with yellow fever and having held no communication which is liable to convey infection to the vessel or her crew, may be exempted from the quarantine restrictions imposed on merchant vessels from such ports.

L. J. GAGE, *Secretary.*

ADDITION TO QUARANTINE REGULATIONS—CONSULAR BILLS OF HEALTH.

[Circular.]

TREASURY DEPARTMENT, April 12, 1898.

To Officers of the Treasury Department, Consular Officers, and Others Concerned:

Referring to Department circular dated April 26, 1894, United States Quarantine Laws and Regulations, and to Article I, paragraph 2, regulations to be observed at foreign ports, the following addition is hereby made to the consular bill of health (Form 1931a), to be furnished vessels bound for the United States, viz:

“Number of cases of sickness and character of same while vessel was in this port, ———.”

L. J. GAGE, *Secretary.*

AMENDMENTS TO QUARANTINE REGULATIONS—INSPECTION OF CERTAIN VESSELS
AND BAGGAGE ON AND AFTER APRIL 1 AND UNTIL NOVEMBER 15.

[Circular.]

TREASURY DEPARTMENT,

Washington, D. C., October 22, 1898.

To Officers of the Treasury Department, State and Local Quarantine Officers, Consular Officers, and Others Concerned:

The following amendments to the Quarantine Regulations, to be observed at ports and on the frontiers of the United States, are hereby promulgated:

Article II, paragraph 2, exception 1, is amended to read as follows: Vessels arriving during certain seasons of the year, to wit, November 15 to April 1, may be admitted to entry.

Article II, paragraph 2, exception 2, is amended by striking out the words "November 1" and inserting the words "November 15" in lieu thereof.

O. L. SPAULDING, *Acting Secretary.*

VESSELS FROM INFECTED PORTS BOUND FOR APALACHICOLA TO
PROCEED FIRST TO A DISINFECTING STATION.

The following correspondence is self-explanatory:

OFFICE OF THE COLLECTOR OF CUSTOMS,

Port of Apalachicola, Fla., May 27, 1898.

SIR: In view of the delay, inconvenience, and expense incurred by masters and owners of foreign vessels, due to health regulations requiring vessels arriving here from infected ports, especially from Para, to depart for some fumigation station for proper disinfection, I am requested by shippers and consignees to ask the Department to urge upon consuls stationed at infected ports to instruct ship masters destined for this place to call en route at a fumigation station for proper sanitation, and thus obviate the delay and expense otherwise entailed.

Very respectfully,

WM. B. SHEPPARD, *Collector.*

THE SECRETARY OF THE TREASURY.

DEPARTMENT OF STATE,

Washington, D. C., July 8, 1898.

SIR: Referring to your letters of the 4th and 15th ultimo, in regard to the disinfection of vessels bound for Apalachicola from infected ports, I have the honor to inclose for your information copies of a circular on the subject issued June 30, 1898, to our consular officers in Mexico, Central and South America, and the West Indies.

Respectfully, yours,

WILLIAM R. DAY.

THE SECRETARY OF THE TREASURY.

[Inclosure—Circular.]

DEPARTMENT OF STATE,

Washington, June 30, 1898.

The Consular Officers of the United States:

GENTLEMEN: In accordance with the request of the Secretary of the Treasury, in letters of the 4th and 15th instant, you will notify all vessels destined for Apalachicola, Fla., to proceed to one of the following stations for disinfection, when the port from which they sail is infected: Mullet-Key (Tampa Bay Quarantine Station), Ship Island (National Quarantine Station), Pensacola Quarantine Station.

The Tortugas National Quarantine Station is temporarily closed to commercial vessels on account of the war with Spain, but is available for all vessels of the Navy.

Respectfully, yours,

THOS. W. CRIDLER,

Third Assistant Secretary.

REPORTS FROM THE NATIONAL QUARANTINE STATIONS.

REEDY ISLAND QUARANTINE; POST-OFFICE ADDRESS, VIA PORT PENN,
DEL.

REPORT OF THE MEDICAL OFFICER IN COMMAND, P. A. SURG. R. M. WOODWARD
(ASSUMED COMMAND UNDER OFFICIAL ORDERS OF JANUARY 27, 1897).

Report of transactions, repairs, and improvements during 1898.

REEDY ISLAND QUARANTINE, VIA PORT PENN, DEL.,

August 31, 1898.

SIR: I have the honor to transmit herewith a synopsis of the transactions of this station for the fiscal year ended June 30, 1898, for the Surgeon-General's annual report:

Number of vessels inspected.....	980
Number of vessels disinfected.....	3
Number of steerage passengers inspected.....	9,232

Respectfully, yours,

R. M. WOODWARD,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REEDY ISLAND QUARANTINE, VIA PORT PENN, DEL.,

July 1, 1898.

SIR: As required by article 644, Regulations Marine-Hospital Service, 1897, I have the honor to report that the following repairs and improvements have been made at this station during the fiscal year ended June 30, 1898:

An oil house has been built. Board walks have been laid connecting gangways, artesian well, and small pier. The iron sheathing on the ice breaks of the pier has been replaced where lost or loosened. The topmast of the flagstaff on the pier has been lowered and painted and fitted with housing and pin, so that it can be lowered in future with ease. The railing on the island gangways has been completed and painted and additional steps built. A movable railing has been erected about the well in the boathouse. The board sheathing on the piling beneath the buildings on the island has been improved by placing weather strips over the cracks between the boards. The artesian-well water has been piped to the boathouse for use on the steamer *Pasteur*. Shelving and bins have been built in the provision storeroom. Two bushels of grass seed have been sown on the reservation. Glass panels have been placed in the front and back hall doors of the surgeon's quarters and a stationary washstand placed in bathroom of same. Repairs have been made to the roofs of the buildings and a new rain gutter placed on the pier shed. A great deal of general repair work and painting has been done.

Respectfully, yours,

R. M. WOODWARD,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

DELAWARE BREAKWATER QUARANTINE; POST-OFFICE ADDRESS, VIA
LEWES, DEL.

REPORT OF THE MEDICAL OFFICER IN COMMAND, P. A. SURG. G. B. YOUNG
(ASSUMED COMMAND UNDER OFFICIAL ORDERS OF NOVEMBER 27, 1897).

Report of transactions, repairs, and improvements during 1898.

MARINE-HOSPITAL SERVICE,
DELAWARE BREAKWATER QUARANTINE STATION, VIA LEWES, DEL.,
November 1, 1898.

SIR: In compliance with Bureau letter of October 3 I have the honor to transmit herewith the following statement of the operations of the service at the Delaware Breakwater Quarantine Station during the fiscal year ending June 30, 1898.

The apparent neglect in complying with said letter is due to the fact that the letter in question was received at the station during my absence in Washington, and I have only just learned of its existence.

The station was in charge of P. A. Surg. C. P. Wertenbaker from June 30 to November 23; of P. A. Surg. J. O. Cobb from November 23 to November 30; of P. A. Surg. C. P. Wertenbaker from that date until December 23, when he was relieved by Asst. Surg. C. H. Lavinder, who remained in charge until December 30.

P. A. Surg. G. B. Young assumed command December 30 and remained in command during the rest of the fiscal year, except during the period from March 14 to April 1.

The occurrence of the war materially reduced the amount of work done at the station.

The following is a summary of boarding work:

Vessels inspected and passed with pratique.....	259
Vessels inspected and passed without pratique.....	3
Vessels spoken and passed	2
Total.....	264

Two vessels have been detained in quarantine—the British bark *Port Carlisle*, from Java, held on account of the death of one of the crew from Asiatic cholera, and the Norwegian steamship *John Wilson*, from Bocas del Toro, held because of the death, of the day previous to arrival, of the chief engineer from yellow fever.

Very respectfully,

G. B. YOUNG,
Passed Assistant Surgeon, U. S. M. H. S., in Command.
SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

DELAWARE BREAKWATER QUARANTINE STATION, VIA LEWES, DEL.,
August 31, 1898.

SIR: In compliance with paragraph 644, Regulations of 1897, I have the honor to transmit the following report of the repairs and improvements made at this station during the fiscal year ending June 30, 1898:

A new porch has been erected at the executive building; cost, \$1,498. Exterior woodwork of executive building has been painted; cost, \$362. A new pair of axles has been put on wagon; cost \$24.90. Minor repairs to quarters, launch, etc., material for construction of "marine railway," and repairs to pier, aggregating \$71.25. These expenditures were prior to my assumption of the command.

Under my command the following have been done: The tent frames in camp have all been made over, floored, sided, and provided with racks to enable the

flies to be stretched. A storehouse large enough to hold the entire camp equipment has been erected in the camp inclosure and so constructed as to be practically air-tight, enabling the equipment to be sulphured without removing from camp. A small air-tight chamber for formaldehyde disinfection has also been constructed. A heavy bulkhead 338 feet in length has been built between the piling and the fence at the northeast corner of the reservation. Fender piles have been planted along the small pier. Some of the partitions have been removed in the end of the north barracks and a large carpenter and paint shop constructed in the space so obtained. The room formerly used as a dispensary in the executive building has been shelved throughout and converted into a subsistence and medical storeroom. The coal bins in the south end of the basement have been removed and a large storeroom secured. The entire basement has been painted and whitewashed.

The condemned-property room has been shelved and whitewashed. A laboratory, with necessary shelving, etc., has been installed in the end of the south barracks. The former driven wells have been abandoned, new wells driven in groups and arranged in couples with piping, etc., so as to give a supply of about 8,000 gallons per day. The kitchen sewer has been removed, all drains, etc., about the hospital, steward's quarters, etc., connected to one line of sewer, and the former terra-cotta sewer replaced with heavy iron pipe. In addition some 125 feet of iron sewer pipe have been laid in connection with the camp and executive-building sewers, both having been destroyed by a gale. The barge has been painted inside and out. About 300 feet of new walks have been laid and a number of old walks repaired. About 250 feet of fence, wrecked by a gale, has been rebuilt, the posts being spiked to 2 by 6 inch scantling on either side, thus lengthening them sufficiently to admit of their being set 6 feet in the ground. The contagious-disease or suspect hospital has been put in thorough repair and the interior woodwork given two coats of enamel paint.

The work has been done by the attendants, for the most part, with material purchased for the purpose, but some additional labor has been employed on the carpenter work. Total cost of labor and material, \$530.15.

Respectfully, yours,

G. B. YOUNG,

Passed Assistant Surgeon, U. S. M. H. S., in Command.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

CAPE CHARLES QUARANTINE; POST-OFFICE ADDRESS, FORT MONROE, VA.

(Boarding and disinfection station, ship *Jamestown*, Hampton Roads; hospitals and detention barracks, Fishermans Island, off Cape Charles, Va.)

REPORT OF THE MEDICAL OFFICER IN COMMAND, P. A. SURG. W. J. PETTUS
(ASSUMED COMMAND UNDER OFFICIAL ORDERS OF NOVEMBER 16, 1895.)

Report of transactions, repairs, and improvements during 1898.

CAPE CHARLES QUARANTINE, *July 12, 1898.*

SIR: I have the honor to submit the following report of transactions at this station during the fiscal year ending June 30, 1898:

Three hundred and seven vessels were boarded and inspected, 11 of which were disinfected.

Steamer Dagmar.—During March, 1898, minor repairs were done to steamer *Dagmar*, amounting to \$31, and during the same month the steamer was hauled out on ship's ways and bottom scraped and painted at a cost of \$140.

In May, 1898, repairs to the woodwork of small dinghy were made, costing \$13.

Steamer Koch.—During March, 1898, the ship was hauled out on the ways and bottom scraped and painted at a cost of \$140. During same month the bichloride pump was overhauled and all iron piping replaced by brass, costing \$140. During May, 1898, repairs to bichloride pump were made, costing \$46.43.

Quarantine ship Jamestown.—During August, 1897, five iron hoops were put on bichloride tank, forward, costing \$19. During September, 1897, new valves were placed in bichloride pump, costing \$6.08. During same month a new set of awnings were purchased at a cost of \$174.88. During February, 1898, bilge pump was overhauled, costing \$55; and in the same month a rotary screw ventilator for galley stove was purchased, costing \$15. During March, 1898, repairs to woodwork of *Jamestown's* dinghy were made at a cost of \$20.

Naphtha launch.—During March, 1898, repairs to railing and woodwork were made, and also new fender moldings were put on at a cost of \$20. During May, 1898, a break in coil was repaired at a cost of \$1.50. During June, 1898, it became necessary to provide a new coil, as the old one gave out suddenly. The fittings of the engine refused to work, necessitating the purchase of new ones at a total cost of \$49.05.

Fishermans Island.—No repairs were made at Fishermans Island except that done by the keepers. The roofs of the buildings were retarred. Much needed repairs to wharf and gangway have been authorized and the contract let. The keeper has planted thirty or forty trees about the buildings, many of which are living, relieving to some extent the barren look of the island.

Additions, alterations, and repairs necessary during 1899.

Steamer Dagmar.—General repairs to woodwork of steamer *Dagmar* will be necessary; estimated cost, \$600, including calking of deck, new after grating and rigging, and renewal of woodwork along the bulwarks. Provision should be made for drainage of water from the deck, where from faulty construction the water does not drain off properly. The two old mast collars should be replaced by new ones. Two new skylight covers are needed. Steamer should be hauled out and bottom scraped and painted. A leak in the fresh-water tanks is now being repaired.

Steamer Koch.—A new sulphur furnace of modern design is needed to replace the old one, which works in an unsatisfactory manner; estimated cost \$800, including a new fan for forced draft. Steamer should be hauled out and bottom cleaned and painted early next spring; estimated cost, \$150. General repairs, estimated cost, \$250.

Ship Jamestown.—A steam windlass is needed forward on the gun deck to get up anchors; estimated cost, \$1,500. General repairs, estimated cost, \$150.

Naphtha launch.—General repairs probably necessary during the year, estimated cost \$50.

Fishermans Island.—It is thought that the 90 additional creasoted piles now contracted for will put the wharf and gangway in good condition. The large tank on the house on the wharf should be taken down and put on a new frame near the present one, which is too small to supply the baths, water-closets, etc. Some methods to protect the fumigating house from the inroads made by the storms should be made, as the beach has been washed away to within 20 feet of the house. It is thought that loose stone thrown in would serve the purpose, with two or three lines of piling driven in to hold the stone in place. Estimates for transfer of the tank and extension of the sewer pipe further out in the water were furnished by the supervising architect some time since. An isolation ward is much needed with eight or ten beds, to be built some distance from the barracks. It is thought that a suitable building would cost about \$2,000.

In last year's report the need of a new house for the two keepers was urged,

and the recommendation is renewed this year. It is thought a suitable house could be built for \$2,000. The house should be a story and a half in height on account of the violent storms that prevail during some seasons. General repairs to buildings and machinery, estimated cost \$500.

W. J. PETTUS,

P. A. Surgeon, U. S. M. H. S., in Command.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

CAPE FEAR QUARANTINE STATION; POST-OFFICE ADDRESS, SOUTH-PORT, N. C.

REPORT OF THE MEDICAL OFFICER IN COMMAND, P. A. SURG. B. W. BROWN
(ASSUMED COMMAND UNDER OFFICIAL ORDERS OF AUGUST 2 1898).

Report of transactions, repairs, and improvements during 1898.

CAPE FEAR QUARANTINE STATION,

Southport, N. C., October 3, 1898.

SIR: I have the honor to submit herewith the following report of the repairs and improvements and general transactions at this station for the fiscal year ending June 30, 1898:

Sanitary transactions.—During the year 45 sailing vessels and 37 steamships arrived at this station. Of this number 4 sailing vessels and 2 steamships were disinfected: 39 sailing vessels and 33 steamships were inspected and passed, and 2 sailing vessels and 2 steamers were spoken and passed. One of the vessels disinfected, the Danish barkentine *Anna*, arrived here in June from Para, Brazil, having had one death en route from yellow fever. No sickness on arrival and none developed while in quarantine.

Repairs and improvements.—The braces on the pilings at the wharf were removed and replaced by creosoted yellow-pine braces, fastened with copper bolts at the bottom and galvanized-iron bolts at the top. One of the dolphins, which was broken off by a large steamer, was replaced and two new dolphins driven, at a total cost of \$2,332.40. The wharf and buildings are now in good condition, except that the buildings need painting very badly. A requisition has been made for paint for this purpose. A hand pump, for fire-extinguishing purposes, at a cost of \$39.40, was purchased, and is very satisfactory. A pair of davits for hoisting up heavy boats, costing \$78.40, was procured and put in use. The copper coil and rudder have been renewed on the naphtha launch *Hermes*, and she is now in first-class order.

The steamer *Woodworth* is in a very bad condition. She leaks to such an extent that it requires five hours' pumping daily to keep her afloat. Steam has to be kept up at all times in order to use the steam pump for this purpose, and the quantity of fuel used will in a short time amount to more than the vessel is worth. Money having been appropriated for the building of the men's quarters, they should be erected as soon as possible, in order to have this vessel removed from the station, as she is beyond repair, and in case of storm a serious menace to the gangways.

Recommendations.—As recommended in my letter of September 21, 1898, barracks should be built for the accommodation of crews of vessels in quarantine. The crew have to be removed from the vessel at least twenty-four hours, and at present there are no accommodations for either sleeping or cooking. The iron pipe leading from the artesian well to the pump, which is now badly corroded, will have to be replaced by a galvanized-iron pipe within the next twelve months. The hoisting apparatus, already appropriated for, is badly needed and should be installed as soon as possible.

Respectfully submitted.

B. W. BROWN,

Passed Assistant Surgeon M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

SOUTH ATLANTIC QUARANTINE; POST-OFFICE ADDRESS, INVERNESS, GA.; TELEGRAPHIC ADDRESS, VIA DARIEN, GA.

REPORT OF THE MEDICAL OFFICER IN COMMAND, P. A. SURG. J. A. NYDEGGER
(ASSUMED CHARGE UNDER OFFICIAL ORDERS OF MARCH 17, 1896).

Report of transactions, repairs, and improvements during 1898.

SOUTH ATLANTIC QUARANTINE STATION, July 6, 1898.

SIR: I have the honor to present the report of the transactions of the Service at this station during the fiscal year ending the 30th ultimo.

Sanitary.—One hundred and nine vessels were inspected and passed, and 20 were disinfected. Of the vessels disinfected 8 were from Rio, 4 from Santos, 2 from Para, 1 from Havana, 1 from Manzanillo, and the remainder from ports of the West Indies and South America. A number of these vessels, on account of their supposed infected condition, were remanded from other stations to this station for treatment. Four were for Brunswick, 2 for Port Royal, and 1 each for Jacksonville and Fernandina. Ten vessels disinfected furnished histories of having had yellow fever or sickness of a suspicious nature on board while in ports of departure or during the voyage.

Improvements.—The ballast wharf, gangway, and spur begun in the spring of 1897 were completed during the year. The combined length of the wharf and gangway is 315 feet. This, added to that of the old wharves, gives a frontage of 588 feet. Two vessels can now be treated at the wharves simultaneously. These additions cost \$13,788. A contract was closed with the Valk & Murdoch Iron Works, Charleston, S. C., to furnish a disinfecting outfit for use on the new wharf. It consists of a 12-horsepower hoisting engine for discharging ballast, sulphur furnace, engine, blower, delivery pipe, bichloride pump, tanks, etc., and will be installed during the present month; cost, \$2,020.

Four buoys for marking the quarantine anchorage were furnished and placed by the Light-House Establishment; cost, \$380.40. An iron mooring buoy, a mushroom anchor weighing 5,000 pounds, and 30 fathoms of 1½-inch stud link chain were purchased. They will be delivered this month. The object of the buoy is to facilitate the hauling of vessels away from the wharves upon completion of disinfection; cost, \$265.

Plans and specifications were prepared for numerous improvements looking toward the more complete equipment of the station. Competitive bids were solicited for the work. The contract was awarded to Frank D. Aiken. The work began in June. Chief among the improvements is a small hospital located on the shore opposite the wharves, at the north end. The ward occupies the wing at the rear of the building, and is 28 by 24 feet in dimension. Wide verandas surround it. In the main part of the building in front are commodious quarters for the physician and nurses, also dispensary, bath rooms, and linen closets. The quarters connect with the ward by a hallway 6 feet wide. They are well provided with verandas. The material used in the building is Georgia pine throughout. It is to be painted without and within, and the interior floors finished in oil (hard finish). When completed it will be a substantial, neat, and most serviceable building; cost, \$2,500.

A landing pier is in course of construction in front of the hospital. It extends out 300 feet in the direction of the wharves. The walkway is 8 feet wide, and running back connects with a walk leading to the hospital. The piles in the outer 100 feet are covered with metal; the remainder are plain with the bark on. At the outer end of the landing is a breakwater, behind which a boat can land in rough weather. It is provided with a hand railing and a drop ladder; cost, \$1,129.

An important adjunct is a boathouse 20 by 30 feet, with a well 9 by 21 feet. It joins on to the rear of the new ballast wharf and gangway. It is built on metal-covered piles and braces. The sides are of upright boards dressed on the outside. Tackle for hoisting boats is provided. The building will be of much service to the station: cost, \$1,000.

Among the improvements is a bath house adjoining the back of the disinfecting shed on the iron wharf. The dimensions are 10 by 30 feet. It contains three rooms, namely: disrobing room, bathroom, and dressing room. They are arranged so the clothing is passed from the disrobing room to the steam chamber. Next is the bath room, and lastly is the dressing room, where the clothing is received after having gone through the steam chamber. The building is on metaled piling, has dressed sides, and is furnished with windows and doors; cost, \$472.

A house was built on the west end of the new wharf. It will be used as quarters for crews while the vessels are undergoing fumigation. It is 16 by 30 feet, and contains two rooms. The sides are of dressed boards. Later the interior will be ceiled and bunks put up. Windows and doors are provided. It cost \$288.

A shed for the reception of the new disinfecting plant was erected on the east end of the new wharf. It is 18 by 30 feet. The sides are of dressed boards; has windows and doors; cost, \$240.

The dredging out of Elliotts Cut began in May. The material is removed at low water by hand labor. Progress is necessarily slow, as the work can be carried on only about four hours in the twenty-four. The navigation of the cut should be much improved when the work is completed. The contract price is \$500.

Repairs.—Piling was placed under the old gangway; cost, \$56. Temporary supporting piles were driven under the iron wharf to prevent it from falling down; cost, \$181. Permanent repairs will be made to this wharf during the present month. The old iron pilings are to be replaced with yellow pine piles covered with copper. The contract has already been closed for the work at \$1,728.

Repairs of a temporary nature were made to the old ballast wharf last fall. The cost was \$125. Estimates for repairing this wharf are now being invited. Cluster fender piles will be driven in front of it shortly. The cost will be \$490.

The launch *Delta* had a new keel put on; also bottom covered with yellow metal and other minor repairs made: cost, \$290.23.

A new fence was built around the reservation and the reservation extended during the winter. A number of shrubs and trees were set out about the reservation.

New floors were laid in the verandas at assistant surgeon's and attendants' quarters; also new timbers placed under same and verandas at surgeon's quarters. Officers' quarters are being painted.

Recommendations.—A telephone line should be run from the north end to Crescent. This would put the station directly in communication with the outside world. The distance to Crescent is about 11 miles. It is estimated that the line will cost \$2,000.

The hospital should have a system of modern plumbing. Water can be piped from the artesian well at the site of the battery, a distance of about 400 yards, at a comparatively small cost. The low ground in the vicinity of the hospital should be well drained. Water collects there during a heavy rainfall. After being drained the low ground should be filled in with oyster shells, of which there is a great abundance on the beach close by. The drain from the low ground and hospital should be carried well out into the sound. It is estimated the piping necessary for supplying water, plumbing, and sewer will cost \$290.

In the interest of economy and better administration of the station, the south end should eventually be abandoned and the station be concentrated at the north

end. As a place of permanent residence the shore at the north end is objectionable on account of malaria. It is recommended that a suitable wharf be built at a point half way between the quarantine wharves and the shore, and quarters for officers and attendants placed thereon. It is estimated that a wharf consisting of two pier heads connected by a gangway with the necessary buildings, etc., will cost in the neighborhood of \$15,000.

Respectfully submitted,

JAMES A. NYDEGGER,

Passed Assistant Surgeon, U. S. M. H. S., in charge of station.
SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

BRUNSWICK QUARANTINE, BRUNSWICK, GA.

REPORT OF THE SANITARY INSPECTOR, DR. R. E. L. BURFORD, IN CHARGE OF THE STATION.

Report of transactions, repairs, and improvements during 1898.

BRUNSWICK QUARANTINE, October 5, 1898.

SIR: During the fiscal year ending June 30, 1898, 61 vessels were disinfected at this station and 177 vessels inspected and passed. Three vessels with sickness aboard were ordered to South Atlantic Station at Sapelo for disinfection. Those disinfected were from Cuban and Brazilian ports, and principally from Havana.

During the year the equipment of the station was improved by addition of new ballast wharf and hoisting engine; two ballast cars, and 200 feet of railroad track on elevated runway for same, thus affording means quite efficient for quick and easy discharge of ballast. Two hundred feet of 1½-inch hose for the use of application of bichloride solution to hold and compartments of vessels was added to the disinfecting plant. New galvanized-iron gutters were placed on both sides of the disinfecting building, and connected to storage tank for supplying the station with water for use of boilers. Minor repairs were made to the machinery in disinfecting shed and to ballast engines.

Respectfully, yours,

R. E. L. BURFORD,

Sanitary Inspector, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

TORTUGAS QUARANTINE STATION; POST-OFFICE ADDRESS KEY WEST,
FLA.

REPORT OF THE MEDICAL OFFICER IN COMMAND, P. A. SURG. L. L. WILLIAMS
(ASSUMED CHARGE UNDER OFFICIAL ORDERS OF APRIL 18, 1896).

Report of transactions during 1898.

TORTUGAS QUARANTINE STATION,

Key West, Fla., August 16, 1898.

SIR: I have the honor to submit the following report of the operations of the Service at this station during the fiscal year ending June 30, 1898:

Eight vessels were inspected and passed and 50 vessels disinfected and held for observation. Nearly all of these vessels were treated during the season of 1897, commercial quarantine having been suspended early in the present year. The vessels were of the following classes: Thirteen steamships, 3 tugs, 28 schooners, 6 barks, 4 barkentines, and 4 barges.

The ports of departure were: Havana, 26; Kingston, 1; Cienfuegos, 3; Matanzas, 3; Sagua, 3; Cardenas, 3; Tunas, 1; Naguabo, Porto Rico, 1; Barbadoes, 2; Fort de France, 1; Point à Pitre, 1; Port Limon, 1; Puerto Cabello, 1; Colon, 2; Para, 2; Pernambuco, 2; Bahia, 3; Rio, 1; Buenos Ayres, 1.

The following vessels were certainly infected: Schooner *B. Frank Neally*, arrived July 10 with two cases of yellow fever; schooner *Anna M. Stammer*, arrived July 16, two suspicious cases at sea and two cases yellow fever occurring immediately after arrival; schooner *John C. Smith*, arrived September 5 with one case yellow fever; bark *Ragna*, arrived December 24, had two deaths from yellow fever at sea.

Six cases of yellow fever were treated, including one patient remaining under treatment at the close of the previous year. There was one death from the disease, that of the patient last mentioned. He had been ill on board for seven days before arrival. Four cases of beriberi were also treated, taken from the Norwegian bark *Mizpa* from Bahia. Nine injured survivors of the battle ship *Maine* were brought to the station from Havana and placed under treatment.

During the winter large quantities of water were furnished to the vessels of the Light-House Establishment, Coast and Geodetic Survey, and to several torpedo boats of the North Atlantic Squadron.

The schooner *Richard K. Fox*, purchased by the Bureau as a dispatch boat for the station, arrived September 4. Her name has been changed, by order of the Bureau, to *W. C. W. Glazier*, in memory of Passed Assistant Surgeon Glazier, who died of yellow fever at Key West. This vessel has proved very satisfactory. The quarantine steamer *Charles Foster* was towed to Tampa for repairs on January 24, her boiler being in such condition that she could not make steam. The schooner *Montross* has been dismasted and converted into a ballast lighter, for which purpose she is well adapted. The naphtha launch and small boats are all in good order.

The hospital is in good condition except that some of the posts show signs of decay.

The disinfecting machinery is in good order. The lead gasket purchased for the steam chamber has not yet been put in place, owing to the absence of the engineer with the steamer *Foster*. On April 1 a cable was laid by the Navy Department from Tortugas to Key West. Dredging operations in the channels leading to Garden Key Harbor and the erection of coaling piers for Navy Department are also in progress. On April 4 commercial quarantine was suspended by order of the Bureau, and this station was ordered to be kept open for the treatment of infected ships of war and transports. On May 8 two companies of United States infantry arrived at the station and went into camp.

Repairs.—I have the honor to report the following repairs made at this station during the fiscal year ending June 30, 1898:

Wharf machinery:

Spring valves for Blake pump	\$0.81
New rotary pump for bichloride solution	29.48
Korting injector for boiler	25.51
New iron band for sulphur furnace	15.00
Thermometer for steam chamber	16.80
Lead gasket for steam chamber	28.35
New hoops for bichloride tank	14.00

Schooner *W. C. W. Glazier*:

New name plates	20.00
New main gaff (made by station force)	

Bird Key Hospital: Roof reshingled at cost of

60.00

The following repairs were made by the station force: Wharf boiler, iron wheelbarrows, and small boats were repaired and new planks laid on the wharf bridge. Numerous minor repairs were made to the machinery of the steamer *Charles*

Foster by the engineer. When this vessel became totally disabled she was towed to Tampa to be thoroughly repaired and passed from under my immediate care.

Respectfully, yours,

S. L. WILLIAMS,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

GULF QUARANTINE STATION; LOCATION, SHIP ISLAND; POST-OFFICE ADDRESS, BILOXI, MISS.

REPORT OF THE MEDICAL OFFICER IN COMMAND, P. A. SURG. A. C. SMITH
(ASSUMED COMMAND UNDER OFFICIAL ORDERS OF MARCH 25, 1896).

GULF QUARANTINE STATION, *October 11, 1898.*

SIR: As directed in Bureau telegram of the 3d instant, I have the honor to report upon the transactions of the Service at this quarantine station for the fiscal year 1898.

The total number of vessels inspected was 308, classified as follows:—

Flags, or nationality.

United States	161	Italy	5
Great Britain	61	Holland	4
Norway	60	Spain	3
Sweden	2	Austria	1
Russia	4	Portugal	1
Germany	5	Mexico	1

Classification, by months, as to foreign or domestic ports of departure.

Month.	From foreign ports.	From foreign ports in yellow-fever latitudes via domestic ports.	From domestic ports.
July	27	2	.....
August	19	1	.....
September	16	.....	22
October	18	1	33
November	17	.....	18
December	13	.....	1
January	11	.....	.....
February	7	.....	.....
March	12	.....	1
April	20	.....	1
May	22	.....	5
June	23	.....	9
Total	214	4	90

Countries or regions from which vessels came.

British Isles	20	East Indies	1
France	2	Mexico	44
Germany	1	Central America	3
Holland	2	Brazil	42
Norway and Sweden	4	South America, except Brazil	22
Denmark	1	Cuba:	
Italy	3	Havana	16
South and East Africa	16	Other ports	14
Cape de Verde Islands	1	West Indies, except Cuba	19
Canary Islands	3	United States	94

Destinations.

Mississippi ports	277	Apalachicola and Carabelle, Fla	7
Mobile	18	Tortugas, Fla	2
New Orleans	1	Key West	3

Cargoes.

Lumber	15	Hardware	2
Coal	3	Ballast alone	144
Charcoal	1	None (swept hold)	123
Groceries and provisions	20		

Kinds of ballast.

Water	32	Sand	29
Iron	3	Sand and stone	32
Stone	35	Rubbish	17

Seven vessels, of which 3 were from foreign ports and 4 from domestic ports, had yellow fever on board on arrival at quarantine. On 2 others that disease occurred during detention in quarantine. Besides these vessels, 8 others—6 from foreign and 2 from domestic ports—gave a history of having had yellow fever on board in course of the voyage, but had none on arrival nor in quarantine. Four vessels gave a suspicious but uncertain history. In the remaining 288 no evidence of infection was discovered.

Treatment, by months.

Month.	Inspected and passed.	Disinfected and held.
July	5	24
August	6	14
September	6	32
October	10	42
November	19	16
December	13	1
January	10	1
February	7	
March	11	2
April	15	15
May	14	13
June	15	17
Total	131	177

Twenty-three cases of yellow fever were treated in the isolation hospital during the year. There were no deaths from the disease, which was in the main mild, with a few severe cases. The other medical and surgical work of the station consisted in such miscellaneous cases as were found on vessels in quarantine and required relief. The total number of cases entered in the register of hospital patients was 63 and in the out-patient register 45. The general health of the station was uniformly good.

The yellow-fever epidemic of 1897, which extended from New Orleans to Mobile in this immediate vicinity, put a great deal of work upon this station, and the record of the station for the entire season was, at the same time, tried as by fire. The efforts which were made to trace the fever to this station and the failure of those efforts, and the vindication of the conduct of the station, are described in other papers relating to the subject.

As soon as the epidemic was declared, early in September, each small and large community in the region affected quarantined against every other community. A large number of small coasting vessels could only pass from point to point by

getting the pratique of this station, and they were accordingly received and subjected to quarantine here. Likewise, whenever yellow fever arose on any of the local craft it was received and taken care of at the station.

In addition to the above a great amount of work devolved upon the station in connection with a scheme for the protection of the shipping in the harbor at Ship Island from infection from shore. This work was instituted by the Mississippi State board of health in conjunction with the Marine-Hospital Service, and the method of conducting it was planned mainly by Surg. R. D. Murray, Marine-Hospital Service, but the execution of it fell entirely upon this station. Dr. C. A. Sheely was employed as sanitary inspector, with headquarters at the quarantine station, and the work was directed by the officer in command of the station. All disinfections were done at the station, and cases of yellow fever which were intercepted or discovered were cared for here. On account of the traffic between the shipping and the shore, with bumboats and stevedores and masters going ashore to transact necessary business, it was found to be a very hard matter to protect the fleet, but the work was successful except in one instance. Two cases of yellow fever arose on board the Norwegian steamship *St. Andrews* just as she was nearly ready to put to sea. The patients were removed and their quarters were disinfected, and the vessel departed. All the other vessels remained healthy during their stay in port.

Following are the rules under which this work was conducted:

MISSISSIPPI COAST QUARANTINE.

RULES TO GOVERN THE LOADING FLEET AT SHIP ISLAND, MISSISSIPPI, FOR REMAINDER OF QUARANTINE SEASON, 1897.

Stevedores' crews shall spend five days in camp on Ship Island or on vessels in quarantine before going on board loading vessels. They may return to Scranton or Biloxi after working on vessels, providing there has been no sickness on the vessel on which they worked. In case of sickness on board five days must be passed on the island or in quarantine.

Pilots shall not board vessels coming in except in case of necessity. In case of vessels going out they must not go below.

Masters and members of crews, on arriving at their vessels from infected points, shall have their clothing and baggage fumigated before going aboard.

The masters and crews of tugs and supply boats shall, under no circumstances, go aboard any vessel in Ship Island Harbor.

No master of any tug or supply boat shall allow any person to board his boat in Ship Island Harbor without permission from the quarantine officer except in cases of urgent necessity.

Masters and mates of vessels in Ship Island Harbor shall not allow any person to go aboard their vessels except by permission of the quarantine officer.

The customs inspector shall board vessels only under the supervision of the quarantine officer.

Masters and crews of ballast lighters shall not board vessels which they are discharging.

The harbor master shall not go on board vessels except on duty, in which case he shall not go below. His deputies must be immunes, and while discharging ballast shall remain on board, and before going on board shall have their clothing fumigated.

All orders from vessels, except for provisions, shall be approved by the quarantine officer or by the Mississippi State Board, in Biloxi.

Willful violation of these rules will be punished under the laws of Mississippi and the acts of Congress governing quarantines.

All complaints and controversies should be referred to P. A. Surg. A. C. Smith, Marine-Hospital Service, in command of Gulf quarantine.

H. H. HARRALSON, M. D.,

H. A. GANT, M. D.,

For Mississippi State Board of Health:

R. D. MURRAY,

Surgeon, Marine-Hospital Service,

Agent Mississippi Board of Health for Jackson County, Mississippi.

The active quarantine work of the season of 1897 held out until nearly the 1st of December, on account of the local epidemic. The measures for protecting the fleet in the harbor were discontinued November 15. The steamer *William H. Welch* and the disinfecting barge *Zamora* were put out of commission and laid up in Crooked Bayou, Mississippi, November 26. The annual repairing and fitting up of these vessels was done during the winter, the *Welch* being taken to Mobile for that purpose, where the work was supervised by Surg. R. D. Murray.

In accordance with the amendments made to the Quarantine Regulations by Department circular No. 27, February 3, 1898, the active quarantine season in 1898 was instituted April 1. Immediately after the opening of the active season a night patrol of the anchorage was put in operation and has been maintained continuously. The patrol is made by two men with a small boat. On May 23 an inspection post was established at the west end of Ship Island, near the pass, in connection with the station, the objects being to have vessels under observation from the time of their approaching the harbor, to inspect vessels from healthy ports at that point and save them from coming up to the main station, and to hold general supervision over the health of the harbor. Acting Asst. Surg. C. A. Sheely was employed for the work and was equipped with a sloop, a yawl, and two boatmen. The sloop afterwards became unserviceable and it was necessary to substitute a whaleboat for it and to erect tents on the land for the accommodation of Dr. Sheely and the boatmen.

The closing of the Tortugas Quarantine Station early in the spring of 1898 threw some extra work on this station, particularly with relation to vessels bound for Apalachicola, Fla.

The repairs and improvements to the buildings and grounds have been described in a separate report, dated July 26. The repairing or rebuilding of the two wharves or footbridges was the most important of these. Under the head of new equipment may be mentioned an excellent new whaleboat, which was built under contract, and two new skiffs, built at home.

The expenditures of the station for the year were as follows:

Repairs and preservation of public buildings.....	\$1,591.93
Repairs of <i>Welch</i> and <i>Zamora</i>	1,779.38
New whaleboat, the <i>Lily</i>	320.00
Sloop <i>Nanon</i> and equipment.....	668.00
General expenses of conducting the station.....	18,064.74

The requirements of the station in the way of new construction and equipment have been reported upon under date of August 10. If this remains the only national quarantine station in the Gulf of Mexico west of Tortugas it is inevitable that its importance and the amount of its work must increase, as it has already been doing for the past three years. It is very necessary, therefore, that it should be equipped in the completest manner.

Respectfully, yours,

A. C. SMITH,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

SPECIAL REGULATIONS FOR GULF QUARANTINE FOR SEASON OF 1898.

GULF QUARANTINE STATION, *May 9, 1898.*

SIR: As directed in Bureau letter of the 9th instant, I have the honor to transmit herewith inclosed a copy of my "Special notice" of the season of 1898.

Respectfully, yours,

A. C. SMITH,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

[Inclosure.]

SPECIAL NOTICE.

GULF QUARANTINE STATION, SEASON OF 1898.

To the Masters of Vessels Detained in Quarantine:

During your detention in the quarantine anchorage, you are enjoined to observe the rules of the quarantine station strictly, both before and after the disinfection of your vessel.

Every vessel is required to put up the yellow flag, "Q," on entering quarantine, and to keep it up while in quarantine until receiving pratique.

No communication shall be held with any boat or vessel or person outside the quarantine station.

No communication shall be held between vessels in quarantine, except with the special permission, in each case, of the medical officer in command; and such permission will only be given, if at all, after both vessels have been disinfected.

All letters, telegrams, messages, orders for supplies and the like must be sent through the quarantine station.

No boat or person from your vessel shall leave the side of the vessel or be cruising on the water while the transfer boat is at the barge or in its vicinity. Your boat may be sent for supplies only after the transfer boat has left the vicinity of the quarantine anchorage, and you must not attempt to hail transfer boat nor any other outside boat.

You are at liberty to come or send to the office of the station when occasion requires, unless this is specially forbidden in particular cases. The flag signals of the International Code can also be used.

Masters of vessels in quarantine are requested not to give or sell liquor to employees of the station, except with the permission of the medical officer in command.

A guard patrols the anchorage at night, and you are cautioned not to allow anyone to leave the side of your vessel after dark.

A. C. SMITH,

Passed Assistant Surgeon, U. S. M. H. S., in Command of Station.

Report of repairs and improvements.

GULF QUARANTINE STATION, *July 26, 1898.*

SIR: In accordance with paragraph 644, Regulations Marine-Hospital Service, I have the honor to report the following repairs and improvements made at this station during the fiscal year 1898:

The most important item is the repair of the two wharves which are used for boat landings. All the piling was replaced with strong piles sheathed with yellow metal, and much of the decking was renewed. The cost was \$1,413.60 for materials and labor. There is still an allowance of \$157.40 remaining unexpended, for bracing the piling, but the work could not be carried on during the active quarantine season.

A temporary footbridge across the lagoon, which has proved a great convenience, was built without any outlay of money, of such materials as could be picked up on the island and with the labor of the attendants.

The sum of \$31.80 was expended for sewer pipe for drains, but there has been no chance yet to lay the drains.

A driven well was put down near the executive building, at a cost of \$21.60. The water is not suitable for drinking, but serves for washing and scrubbing, and fully repays the cost of the well.

Other items, with cost, are as follows:

Galvanized iron chimney caps for executive building	\$10.00
Fencing materials, to exclude cattle and hogs from the immediate vicinity of some of the buildings	50.00
Shingles and nails for repairing roofs	25.93
Lumber for general repairs of walks and buildings and for tent floors....	39.00

Respectfully, yours,

A. C. SMITH,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

SAN DIEGO QUARANTINE, SAN DIEGO, CAL.

REPORT OF THE MEDICAL OFFICER IN CHARGE, ACTING ASST. SURG. W. W. McKAY.

Report of transactions during 1898.

NATIONAL QUARANTINE STATION,

San Diego, Cal., October 3, 1898.

SIR: I have the honor to submit herewith for annual report the transactions of this station for the fiscal year ending June 30, 1898.

During this period the number of vessels from foreign ports boarded, inspected, and passed was 166; none were detained. This is an increase over the preceding year of 28 vessels and 40 more than the year previous. The increase is due principally to an increased commerce with Mexican coast points.

The repairs and improvements made at this station during this period were as follows: Repairs made to boathouse entrance, carpenter work and painting all being done by the station carpenter; the removal of the iron piling and stumps of wooden piling immediately beneath the boathouse wall, and which acted as an obstruction to the safe handling of boats in rough weather, was accomplished by the aid of a steam tug and derrick.

Removal of iron piling and stumps	\$96.86
Carpenter tools for use of station	22.35
Repairs to plumbing in surgeon's quarters	15.00
Repairs and repainting boats and launch (materials)	23.00
New canvas storm curtains, forward part of launch (materials)	5.40
Repairs to moorings (materials)	6.00
Repairs to vacuum pump, disinfecting plant	10.75
Repairs to old naphtha engine	65.00
New flagstaff on wharf and for fence (materials)	24.50
New window light and glass for front door in hospital	1.50
Painting floors of outside porches, boathouse. etc. (material)	24.75
Total	295.11

Most of the labor necessary in making the above repairs was performed by the employees of the station.

The Fifty-fifth Congress appropriated \$1,600 for providing a new engine to take the place of the old worn-out naphtha engine in the quarantine launch and for

making the necessary alterations and repairs to the launch for its reception. The sum of \$1,000 was also appropriated for improving the water service of the station, and as soon as the winter rains have fallen sufficiently to soften the ground so that the pipe can be laid without blasting out a ditch for it, a new pipe line will be laid to connect the water system of the station with the water company's large reservoir on the bluffs back of the station, thus giving at all times a good water pressure in the mains and hydrants.

On account of an increased commerce with Mexican and Central American coast points, together with the annexation of Hawaii and other Pacific possessions, the future importance of this station can hardly be overestimated. The views of conservative observers are that, with the new order of things, a trade is bound to come to this Pacific coast and that California's prosperity will be promoted beyond that ever experienced before, and there are but three great ports on this coast where large ocean steamers can safely enter at all times and lie at the docks in direct communication with transcontinental railroad lines. These ports are, in the order named, Puget Sound at the north, San Francisco in the center, and San Diego at the extreme south, the latter port being the Pacific coast terminal of the Santa Fe railroad system, where, as may be seen by the inclosed clipping, they are already making preparations for the inauguration of an Oriental line of steamships. The necessity for the early completion and equipment of this station, therefore, is obvious and can not be too strongly urged, as in its present unfinished condition there is no place where steerage passengers can be bathed, no detention barracks, and no quarters for the crews of infected vessels, or for the accommodation of cabin passengers.

An estimate of the cost of these improvements and additions has already been submitted under separate cover in my report of date July 14, 1898.

Respectfully, yours,

W. W. MCKAY,

Acting Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

Report of repairs and improvements.

NATIONAL QUARANTINE STATION,

San Diego, Cal., July 5, 1898.

SIR: In compliance with instructions contained in paragraph 644, Revised Regulations, approved November 29, 1897, I have the honor to forward herewith report of repairs and improvements made at this station during the fiscal year ending June 30, 1898:

Repairs made to boathouse, changing entrance to boathouse well, so as to	
lower boats parallel with tides	\$96.86
Carpenters' tools purchased, in amount	22.35
Repairs to plumbing and new water-closet bowl, surgeons' quarters	15.00
Material for repainting and repairing boats and launch	23.00
Material for new canvas storm curtains, forward part launch	5.40
Repairs to moorings, new mooring chain	6.00
Repairs to vacuum pump, disinfecting plant	10.75
Repairs to launch engine	65.00
Material for new flagstaff on the wharf and for fencing	24.50
Three new window lights for buildings and for one glass for front door of	
hospital	1.50
Paints and material for repainting outside of porch of boathouse and boat-	
man's quarters	24.75
Total	295.11

The work of making the repairs and alterations was mostly performed by the employees of the station.

Very respectfully, yours,

W. W. McKAY,

Acting Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

SAN FRANCISCO QUARANTINE, ANGEL ISLAND, CALIFORNIA; TELEGRAPHIC ADDRESS, VIA TIBURON, CAL.

REPORT OF THE MEDICAL OFFICER IN COMMAND, P. A. SURG. M. J. ROSENAU
(ASSUMED COMMAND UNDER OFFICIAL ORDERS OF MARCH 2, 1896).

Report of transactions during 1898.

NATIONAL QUARANTINE STATION,
Angel Island, California, October 4, 1898.

SIR: Complying with instructions, I have the honor to transmit the following detailed transactions at this station for the fiscal year ending June 30, 1898:

Considerable activity marked this year on account of the widespread prevalence of yellow fever. The disease existed on the Pacific coast of North and South America from Guayaquil in Ecuador to Manzanatlan in Mexico. It appeared to start from the southern point and move northward. Every vessel arriving here from Panama and Central American ports during the yellow-fever season brought a report of cases and deaths en route. Some of these cases were admitted to be yellow fever, others were malarial, and some were undetermined. It was therefore necessary during height of the fever season, lasting from June to the latter part of August, to disinfect every vessel from Panama and Central American ports.

On the 24th of August the *Mincola*, from Panama, was passed without disinfection, and from this date on the situation steadily improved.

During the summer (1897) large numbers of persons left the infected regions for the more healthful climates of our country. These refugees landed here and dispersed to all parts. Therefore all baggage, including that of the cabin passengers, was disinfected. Several vessels were disinfected on account of smallpox. In all cases this disease was brought on board by Chinese steerage passengers at Hongkong. One ship was treated on account of three cases and one death from an undetermined sickness with bubonic swellings. This was done on account of the possibility of the cases having been plague.

All baggage and personal effects of Chinese and Japanese steerage passengers arriving at this port during the fiscal year was disinfected as a matter of precaution. This was done on account of the existence of plague, smallpox, cholera, and epidemic dysentery in the Orient. The baggage is assorted and disinfected with steam or formaldehyde. All persons quarantined are bathed and furnished a suit of jeans while their body clothing is being steamed.

In all, 7,616 persons were treated in quarantine; 16,672 pieces of baggage have been opened, assorted, and disinfected; 57 bags of mail have been disinfected; 15 vessels were disinfected. Of these 11 were passenger liners, 3 ships, and 1 bark.

Respectfully, yours,

M. J. ROSENAU,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

*Report of repairs and improvements.*NATIONAL QUARANTINE STATION,
Angel Island, Cal., September 9, 1898.

SIR: Complying with paragraph 644 of our regulations, I have the honor to forward the following detailed statement of the repairs and improvements which have been made at this station during the preceding fiscal year:

Paints, oils, and painters	\$522.28
Artesian well borings	288.00
Vacuum apparatus, disinfecting chambers	188.00
Engineer and carpenter's tools	243.00
Worthington steam pump	99.69
Repairs to steamer <i>Geo. M. Sternberg</i>	1,792.79
Cement sidewalk	79.50
Removing landslide	120.00
4-inch fresh-water pipe to tanks	254.00
25 lamps	99.75
Repairs to <i>Bacillus</i>	73.60
Repairs to disinfecting apparatus, <i>Omaha</i>	46.56
Repairs to station, miscellaneous	183.75
Furniture and equipment, bath house	418.58
70 beds, pillows, and mattresses	890.00
Total	5,299.50

The outsides of all the buildings have been painted with two coats of lead and oil. The lazaretto and parts of other buildings have been painted and renovated inside. The interior finish of the lazaretto is now a smooth surface, that may be scrubbed or sprayed.

Two wells, 8 inches in diameter and double cased, have been bored to solid rock. The one is 65 feet and the other is 75 feet deep. The water stands to within 10 feet of the surface in both these borings. Experimental pumpings demonstrate that a well 4 feet in diameter sunk to the bed rock will furnish all the fresh water the station needs.

The vacuum apparatus has been extended to the other two disinfecting cylinders. It is now possible to obtain 15 inches of vacuum in any one of the chambers in one minute.

The boarding steamer *Geo. M. Sternberg* has been docked, her bottom scraped and patched, and numerous miscellaneous repairs have been made to her hull and machinery. The guards have been renewed and widened and protected by a galvanized-iron fender strip. The forward lockers have been broken out and a commodious office, with desk and furnishings, arranged.

One thousand six hundred and eighty feet of concrete sidewalk have been laid, extending along the edge of the cove from the dock to the office. Concrete landings have been placed before many of the entrances to the various buildings.

A 4-inch black iron pipe has been laid from the dock to the fresh-water tanks, and is used both as a supply and delivery pipe.

The salt-water pipe, with hose attachments for use in case of fire, has been extended to the dock.

Minor repairs to the machinery of the *Bacillus* have been made from time to time, and she has been docked and her bottom cleaned and coated with copper paint. The small boats have all had their semiannual overhauling.

The new bath house has been furnished with cork carpets, chairs, stools, benches, window shades, tables, racks, etc.

The grounds have been further cleared of underbrush, and some grading has

been done. More trees and plants have been laid out. The roads have been resurfaced and kept in better condition by wetting down daily with salt water.

Respectfully submitted.

M. J. ROSENAU,

Passed Assistant Surgeon, U. S. M. H. S.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

PORT TOWNSEND QUARANTINE, PORT TOWNSEND; WASH.

(Boarding station, Port Townsend. Disinfecting station, Diamond Point.)

REPORT OF THE MEDICAL OFFICER IN COMMAND, SURG. S. D. BROOKS (ASSUMED COMMAND UNDER OFFICIAL ORDERS OF FEBRUARY 17, 1898).

Report of transactions during 1898.

PORT TOWNSEND QUARANTINE,

Port Townsend, Wash., October 5, 1898.

SIR: I have the honor to transmit the following report of transactions at this quarantine station during the fiscal year ended June 30, 1898, as directed in your telegram of the 2d instant:

The total number of vessels inspected was 297, of which 157 were sail and 140 steam, and of the latter number 50 were steamships from ports other than British Columbia and all but a few from Asia.

The crews on these vessels numbered 10,055 and the passengers 5,308, the latter including 1,099 Chinese, 431 Japanese, and 3,778 whites.

The only ship held in quarantine for actual disease during voyage was the British Bark *Cape York* from Panama, which had had 8 cases of yellow fever and 4 deaths. This ship was thoroughly disinfected. A smaller number than usual of ships from China and Japan have brought infectious diseases during this year, and the fact that these have entered at Victoria, British Columbia, before coming into Puget Sound has relieved this station of their disinfection.

The majority of the passenger steamships entering Puget Sound from the Orient have had steerage apartments and quarters for crew disinfected, the Asiatics in crew and all steerage passengers bathed, and all their effects, including bedding, disinfected. Steamships entering Victoria, British Columbia, first have been so treated at the British Columbia quarantine, and this comprises 17. In the case of 13 entering here first this work was done either by landing steerage passengers and their effects at Diamond Point after transfer to a tug, allowing the ship to enter at once, or by taking the ship to Diamond Point (since the outbreak of plague in Hongkong the past few months) and carrying out disinfection as already detailed. This safeguard requires but a portion of a day and is a necessary precaution in the absence of similar work at the port of departure. The figures for this work at Diamond Point show that 408 of crew and steerage passengers have been bathed and all their effects disinfected. In addition, 199 Asiatics seeking entrance to this country and not showing evidence of recent vaccination have been vaccinated.

Respectfully, yours,

S. D. BROOKS, *Surgeon, U. S. M. H. S.*

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

Report of repairs and improvements.

PORT TOWNSEND QUARANTINE.

Port Townsend, Wash., October 8, 1898.

SIR: I have the honor to make the following report of repairs and improvements carried out at this quarantine station during the fiscal year ended June 30, 1898:

A bath house, begun during the previous fiscal year, was completed. This

building is 50 by 20 feet and contains at one end a room for undressing, in the center the bathroom, where are ten showers for men and two for women, with private undressing and dressing rooms communicating with each of the latter, and at the other end a room for men to dress in. A tank overhead contains the water for the bath, heated by steam from the boiler on the wharf. The work of constructing this building was accomplished by the attendants at the station.

An extension to the wharf of 12 feet out into deeper water, also begun during the previous fiscal year, was completed, affording a depth of 24 feet at one end, diminishing to 19 feet 6 inches at the other at lowest tide. The wharf is 109 feet front. This extension was done by contract, at a cost of \$550.

The division of the single large sleeping room in the attendants' quarters into eight small rooms, each 10 by 9 feet and each containing eight berths in tiers of four, and two somewhat larger sitting rooms, one now serving as the telegraph office, was also carried over from the last fiscal year and finished. This was accomplished by the attendants and was carried out for the special purpose of providing means for housing ships' officers or cabin passengers until it was possible to construct a building for that special purpose.

The main sewer at the station became stopped and was all taken up and relaid by the attendants at a trifling cost (\$5.60) for new material. Two manholes were constructed in the lower, nearly level portion, which will obviate obstructions in the future.

Seven hundred and forty-six yards of canvas was bought, at a cost of \$178, and from this the attendants made 165 bunks for the Chinese barracks. But this whole number made the building overcrowded, and it is intended to use only 140. This is the limit of and only accommodation on shore for steerage passengers and crews of vessels.

The roof of the housing over the deck of steamer *Iroquois* has received minor repairs during the year.

The engine of the naphtha launch *Cascade* has been taken apart and repaired twice during the year. The hull of the launch has been painted, the copper sheathing repaired, etc. The rowboats (4) at the boarding station and at Diamond Point have received repairs and have been painted.

Respectfully, yours

S. D. BROOKS, *Surgeon, U. S. M. H. S.*

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

NATIONAL QUARANTINE STATION AT ASTORIA, OREG.

Referring to my last two annual reports, in which this subject is mentioned, I have to state that the sundry civil bill, approved July 1, 1898, carried with it an appropriation for \$30,000 for the establishment and maintenance of a national quarantine station at this point.

Since the passage of this bill a number of inquiries have been received as to the probable date of the opening of the station, as it is a matter of considerable interest to the steamship companies and chamber of commerce at that port.

As soon after the passage of the sundry civil bill as practicable orders were given to Surg. D. A. Carmichael to proceed to Astoria, Oreg. (this officer was at that date under former orders to proceed to Honolulu, Hawaiian Islands), and there, with the aid of the collector of customs and Captain Kilgore, United States Revenue-Cutter Service, to decide on a suitable site for the station.

The following orders were addressed to him:

TREASURY DEPARTMENT, *August 18, 1898.*

SIR: You are hereby designated as a member of a board of officers convened to meet in the office of the collector of customs at Astoria, Oreg., for the purpose of selecting a site for a national quarantine station at or near the mouth of the Columbia River, on or about September 1, 1898, the exact date to be determined by the chairman of the board.

Detail for the board: Surg. D. A. Carmichael, United States Marine-Hospital Service, chairman; John Potts, collector of customs, Astoria, Oreg.; William F. Kilgore, captain revenue steamer *Perry*, Astoria, Oreg., recorder.

Respectfully, yours,

L. J. GAGE, *Secretary.*

Surg. D. A. CARMICHAEL,

United States Marine-Hospital Service, Cleveland, Ohio.

This board, in accordance with the above orders, met at Astoria, Oreg., and, after selecting a site for the quarantine station, made their report, recommending the acquirement of the property selected. It is deemed necessary to secure more land than is included in the property recommended by the board, and negotiations to that end are in progress.

FLOATING QUARANTINE PLANT "PROTECTOR."

The following are the specifications of the disinfecting barge *Protector*, designed by the Service and constructed by the Kensington Engine Works, Philadelphia, Pa., and used at Montauk Point, Long Island. This vessel was constructed for the national quarantine station at Tortugas, Fla., but before being sent South was put in use in the emergency caused by the necessity for a temporary quarantine at Montauk Point:

VESSEL.

Keel.—The keel will be of Delaware oak of first quality, free from damaging defects, sided 10 inches and molded 12 inches. It will be scarfed and then bolted with three-fourths-inch copper bolts, riveted on rings. The keel pieces will be of good length, and the scarfs will be carefully shifted.

Stem.—The stem will be of Delaware oak, sided 10 inches and molded 12 inches outside rabbet. It will be scarfed and bolted with seven-eighths-inch yellow-metal bolts, riveted on rings. It will be bearded at forward edge to 5 inches at water line. The apron piece will be 10 inches, sided and bolted through stem.

Sternpost.—The sternpost will be Delaware oak, free from sap and all other damaging defects, sided 10 inches and molded 12 inches, bolted with seven-eighths-inch yellow-metal bolts above draft line. The deadwood will be of best yellow pine, sided 10 inches and bolted into keel with seven-eighths-inch iron bolts, driven in the most approved manner.

Frames.—The frames will be Delaware oak, double, sided 6 inches and bolted together in the most approved manner, and spaced 20 inches center to center.

Limber.—The frames must be notched for limber chains.

Outside planking.—The outside planking will be of first-quality hard pine, free from sap, shakes, wormholes, and all other defects. It will be 3 inches thick and will be ready for attachment to frame.

Keelson.—The keelson will be hard pine, sided 10 inches by 14 inches high, in

lengths as long as possible, bolted through the throats of the floors well into the keel with seven-eighths-inch iron. The holes underneath the keel will be plugged and white leaded.

Clamps.—The clamps will be of hard pine of the greatest possible length, 4 by 12 inches. The two strakes on each side will be scarfed and bolted with three-fourths-inch iron bolts, riveted on rings and edge bolted where practicable.

Thick strake.—The thick strake in the bilge will be of hard pine, 4 by 8 inches and 5 in number on each side, bolted through timbers with five-eighths-inch iron bolts riveted on rings. The strake will be of good length.

Ceiling.—The ceiling will be of 3-inch hard pine, good lengths, fastened with 6½-inch spikes.

Beams.—The beams will be hard pine, free from sap. The largest beams will be 10 inches and molded 12 inches in the middle and at the ends 7 inches; smaller beams will be sided and molded in proportion. (All beams to be prepared, but only one-fourth placed in position in frame.)

Knees.—All the knees will be of hackmatack. The lodging knees will side 6 inches and be bolted with three-fourths-inch iron bolts, riveted on rings. (All knees to be prepared, but only one-fourth placed in position in frame.)

DISINFECTING MACHINERY.

Boiler.—There will be one vertical tubular boiler, 48 inches diameter, 8 feet 6 inches long, containing 149 tubes 2 inches diameter, 72 inches long, and the furnace 43 inches diameter by 39 inches high. The shell of the boiler to be five-sixteenths inch and the crown sheet and top head to be seven-sixteenths inch thick, constructed of the best homogeneous steel, made by the open-hearth process, and of an ultimate strength not less than 57,000 pounds nor more than 64,000 pounds to the square inch of section, and showing a reduction of area at fracture of 50 per cent and an elongation of 25 per cent when tested in specimens of the shapes and sections required by the regulations of the United States Board of Supervising Inspectors of Steam Vessels. All vertical seams to be double riveted staggered. Holes for rivets may be drilled or punched, but in no case must a driftpin be used to bring holes fair. The water leg to be securely braced with screw stay bolts and to be provided with hand-holes at bottom of water leg and above the top of crown sheet wherever required. Each hand-hole to have plate, bolt, gasket, bridge, etc. The heads of boiler to be flanged with an interior radius of 1 inch and without splitting the edges. Seams to be split and calked inside and chipped and calked outside with Connery calking tool, squarely driven. Hole for main-pipe and safety-valve connection to be cut in head of boiler and reenforced with heavy wrought steel-flanged boss, properly tapped and riveted on. The tubes to be of the best charcoal iron, standard gauge in thickness, lap welded and of American manufacture, properly expanded in the heads with standard expander. A smokestack 20 inches diameter, 15 feet high, is to be furnished and properly connected to hood of boiler, and to be made of No. 10 iron, the top of stack to be reenforced with bar iron and to have hood as shown.

Steam chamber.—There will be one steam chamber of jacketed rectangular shell, 4 feet 4 inches wide, 5 feet 4 inches high, inside, 12 feet long, with a door at each end. The construction of this chamber is fully shown on drawings Nos. 3 and 4. The inside and outside shells of jacket to be constructed of five-sixteenths-inch open-hearth homogeneous steel, of an ultimate tensile strength of not less than 55,000 pounds to the square inch nor more than 60,000 pounds, with a reduction of area at fracture and elongation as called for in the regulations of the United States Board of Supervising Inspectors of Steam Vessels, and are to be separated and braced with three-fourths-inch screw stay bolts and three trusses for 2½ by 2½ inches by one-fourth inch angle, and 5 inches by one-fourth-inch

flat, as shown. The end frames of chamber to be constructed in accordance with details shown on drawing No. 4, and are to be cast in one piece having lugs for eyebolts in the required positions and a groove for the 1-inch-square pure rubber gasket, as shown. The eyebolts to be of the number and dimensions shown, and to be of steel drop forged, with steel washers one-fourth inch thick. The inner and outer shells to be securely riveted to the end frames, and all rivets to be three-fourths inch in diameter, spaced $2\frac{1}{2}$ inches, as shown on the drawings. All rivet holes may be drilled or punched, but in no case must a driftpin be used to bring the holes fair. The flanges for pipe connections to be wrought steel, bossed, riveted securely to shell, and where pipe passes through the inner chamber to be tapped and expanded and calked to make the chamber entirely air-tight. The doors of the chamber to consist of steel plates five-sixteenth inch thick, dished to prevent bracing, and securely riveted to the cast-iron frame, faced true, as shown on drawing No. 4, by three-fourths-inch rivets, spaced $2\frac{1}{2}$ inches apart. The steel sheets to be calked inside and outside, to insure absolute tightness. Each door to be closed by 22 steel eyebolts, as shown, to be pivoted from lugs on end frames and accurately fitted so they can freely swing in and out of notches in door frames. The inside of bottom of chamber to be provided with tracks for cars, with swing sections, as shown on drawing No. 9. Said track to consist of 2 by $1\frac{1}{2}$ by eleven-thirty-seconds inch tee bars. The top of chamber to be fitted with galvanized-iron, three-leaf hood, No. 26 Stubbs gauge, supported by five galvanized carriers, 3.8 by $1\frac{1}{2}$ inch flats. This galvanized hood on both sides, as well as the inside of chamber and doors, to be painted with two coats of white bath-enamel paint. The chamber and doors to be carefully calked and made absolutely air-tight, to enable a vacuum to be obtained in the chamber.

Formaldehyde apparatus.—This apparatus shall consist as shown in detail on drawing No. 5. The formalin retort, 9 inches in diameter, 24 inches long, to be made of copper, with flange brazed thereto as shown, the cap to be faced and finished and fastened to flange by 16 stud bolts five-eighths inch diameter and case-hardened nuts, with an eighth-inch best "Rainbow" gasket. The ammonia retort, 9 inches diameter, 24 inches long, to be made of best cast steel, not less than 60,000 pounds tensile strength, tough and absolutely gas-tight, the cap, of same metal, to be faced and finished and fastened to flange by 16 stud bolts five-eighths inch diameter and case-hardened nuts, with one-eighth-inch best "Rainbow" gasket. The retort to be cased by No. 16 Russia iron and supported in position on chamber by iron brackets, as shown on drawing No. 6, and engraved plates, marked, respectively, "formalin" and "ammonia," to be fastened to casing in positions shown.

Cars.—There will be two cars constructed, as shown on drawing No. 7 and details on drawing No. 8. The truck of car to be made of 4 by 4 by three-eighths inch angles braced by 2 by 2 by five-sixteenths inch angles, as shown, and supported by four flanged wheels of shape and size shown on detail, the axles to be $1\frac{1}{2}$ inches square, securely held by clips riveted to the 4-inch mesh, securely fastened to frame by clips. The body of the car to be constructed of 2 by 2 by five-sixteenths inch angle frames, with $1\frac{1}{2}$ by $1\frac{1}{2}$ by three-sixteenths inch angle guides, the top of frame held by three strips of cypress, 2 by 3 inches, and one longitudinal brace of 2 by $1\frac{1}{2}$ by eleven-thirty-seconds inch 7-bars. To the cypress strips are attached double wardrobe hooks of bronze, spaced alternately 8 inches apart. Each car is to be provided with six movable trays, constructed, as shown, of $1\frac{1}{2}$ by $1\frac{1}{2}$ by three-sixteenths inch angles, properly braced at corners and covered with galvanized wire screens, one-eighth-inch wire, 1-inch mesh, securely fastened to frame by clips. The cars to be provided by eyebolts and lashings to prevent movement or displacement by the rolling of vessel. The truck, body, and movable trays to be painted with two coats of white bath-enamel paint.

Transfer tables.—There will be two transfer tables, constructed as shown upon drawing No. 9. The body to be made of two 4-inch beams 13 feet 10 inches, carrying rails of 2 by 1½ by eleven-thirty-seconds inch T-bars, supported by cast-iron trucks consisting each of two 3 by 3 by three-eighths inch angles, with cast-iron supports, as shown. Bracing to be 3 by 3 by three-eighths inch angle in center and diagonal braces of 2 by one-half inch flats, securely riveted. Eight cast-iron stops are to be provided, to prevent tables from leaving cross tracks at each end. Tables to have two coats of asphalt varnish.

Sulphur furnaces.—There will be two sulphur furnaces, constructed as per drawing No. 10. The shell to consist of three-eighths-inch steel plates, riveted to 1½ by 1½ by one-fourth inch angle frames, with reservoir on top 22 by 24 inches by 6 feet, of similar construction. The fronts, doors, and pans of furnace to be constructed of the best quality of tough, gray cast iron one-half inch thick, and held in position by angles and bolts, as shown. The plates of shell to be riveted together and to angles by one-half-inch diameter rivets, spaced 2 inches center to center. A cast-iron fire pot to be constructed at each end of furnaces, having cast-iron grate and bearing bars, all to be of the dimensions and as shown on drawing.

Bath pump.—The pump to rest on one piece of yellow pine 10 inches thick, of dimensions required by the pump, and capped by a cast-iron water basin, tapped for drainage, extending under full length of pump.

Hot-water generator.—There will be one hot-water generator, 24 inches diameter, 4 feet long, as shown in detail on drawing No. 12, to consist of one-fourth-inch steel shell with three-eighths-inch steel heads, containing six 1½-inch brass tubes 4 feet long, 0.67 pound per foot. The ends of tubes to be covered with cast-iron removable headers, of construction shown, fastened by studs and proper gaskets. The six 1½-inch openings to be reinforced by wrought-steel bossed flanges, securely riveted to shell and tapped. The generator to be supported by cast-iron saddles, securely fastened to deck and banded by 1½ by three-eighths inch flats to shell. Generator to be tight under 150 pounds hydrostatic pressure.

Pressure tank.—There will be one pressure tank, 30 inches diameter by 5 feet 6 inches high, constructed as shown on drawing No. 12. Shell to be one-fourth-inch steel with three-eighths-inch heads, constructed of best homogeneous, open-hearth steel, outlet flanges wrought-steel, bossed, and tank to be tested by hydrostatic pressure of 150 pounds.

Bichloride and fire pump.—The pump to rest on yellow-pine foundation 19 inches thick, of dimensions required by the pump, and capped by a cast-iron water basin, tapped for drainage, extending under the full length and breadth of pump.

Water tanks.—There will be two iron tanks, 7 feet diameter, 7 feet high, constructed of one-fourth-inch sheets, with 2 by 2 by one-fourth inch angle rings at the top, and water-tight bottoms and covers of one-fourth-inch sheets, one for water and the other for bichloride solution. The top of each tank to be provided with manhole and the necessary openings for pipe connections, to be made as shown.

All the above delivered at our works, Philadelphia, Pa.

RELATIONS WITH STATE AND LOCAL HEALTH AUTHORITIES.

The relations of the Marine-Hospital Service with the State health authorities during the trying season which has just passed, as well as during the fall and summer of 1897, were without friction, but on the contrary were characterized by harmonious efforts against the common enemy. During the season just closed there was scarcely any friction, if any at all, even with local authorities, but the previous year, in 1897, there was friction caused by unreasonable and arbitrary local quarantines, which, however, the State authorities themselves could not control, and which gave equal if not greater annoyance to them than to the Service.

The above statement is pertinent in view of the loose assertions sometimes made, indicating undue antagonism between the State and national services. Thus in a recent medical journal the following criticism is made on the Service:

Then there is the constant friction between the Marine-Hospital Service and local boards of health, for, as a consequence of the yellow fever in the South, one State board of health has been compelled to resign.

The board of health referred to was the Louisiana board, with whose resignation in 1897 the Marine-Hospital Service had no possible connection whatever.

Letters expressing appreciation of the efforts of the Service have been received from the State health authorities of Louisiana, Tennessee, and Alabama.

NATIONAL QUARANTINE LEGISLATION.

After the yellow-fever epidemic of 1897 Senator Caffery, whose personal experience had shown him the necessity of national quarantine, came to Washington and called upon me to consider a bill he had prepared. It was gone over by myself and the sanitary board in the Bureau, and its measures carefully considered by the Solicitor of the Treasury, Judge O'Connell, and it met also with the approval of Assistant Secretary Spaulding. It was introduced in the Senate as Senate bill 2680, and the same measure was introduced in the House by Mr. Hepburn, chairman of the Committee on Interstate and Foreign Commerce, as House bill 4363, who carefully examined it. This measure is simply an amendment to the present law (February 15,

1893), which imposed additional quarantine duties upon the Marine-Hospital Service. It is a conservative measure, and provides that, instead of the National Government being required to assist State and local authorities in the enforcement of such regulations as they might see fit to make, which are sometimes absurd, the State and local authorities are required to enforce those of the National Government. It empowers the Secretary of the Treasury to establish quarantines where necessary, either on the coast or on the border, and provides that a national quarantine certificate of pratique, when given, must be accepted. It also makes good a number of other deficiencies which are in the present law, particularly in the matter of penalties, and with regard to interstate quarantine provides for a more positive and efficient exercise of national power.

A full exposition of all that this bill accomplishes is set forth in detail in the statement made by myself and published in the hearing before the Committee on Interstate and Foreign Commerce of the House of Representatives February 19, 1898, a copy of which is appended to this section of the annual report.

This bill has the formal indorsement of the Treasury Department. The Senate Committee on Public Health and National Quarantine, after receiving numerous letters from those opposed to any extension of national quarantine and who objected to any measure tending to strengthen the Marine-Hospital Service, reported strongly in favor of the measure. The House committee gave public hearings extending over a period of more than three months, and all opponents were given full opportunity to make known their views, including those opposed to national quarantine, those who were antagonistic to the Marine-Hospital Service, and those who had other measures which would be unfavorably affected by this bill. By special request of the opponents of the bill the time for these hearings was extended until after a quarantine convention, which met at Mobile, in the hope that the action of the convention would influence the committee against the bill. In spite of all this, the committee, in a very decisive report, recommended its passage. The reports of the Senate and House committees are published herewith, together with the full text of each bill. In Senator Caffery's published speech, Congressional Record, March 22, 23, and 30, 1898, and in the published reports of the hearings before the House committee February 18 and 19 and March 8, 1898, may be found extracts from medical journals, resolutions by commercial bodies, and editorials from newspapers in every section of the country, and particularly the South, favoring national quarantine, and either commending the Marine-Hospital Service or remaining silent concerning it, as though acknowledging without question its present status as the executive arm of national quarantine given to it by the law of 1878 and the more recent law of February 15, 1893. This measure is still pending in the Senate and in the House.

In the meantime the opponents of national quarantine and the enemies of the Marine-Hospital Service and others who, ignoring present law and institutions, desired for various reasons some new organization had combined to prepare a bill to establish a bureau of public health or a commission of public health, and are still using this bill as a means to defeat the other one or any legislation favorably affecting it.

The law of 1893 has brought about great improvements in quarantine, but in its enforcement by the Service, requiring as it does a supervision of local quarantine by the national authorities, many defects with regard to appliances and of administration have been corrected, but not without having developed some antagonism toward the Service. In two instances, under the terms of the law, the President has detailed medical officers to perform the quarantine functions at ports where the administration was alarmingly deficient, and as a consequence certain State and local quarantine officers have opposed the Marine-Hospital Service, declaring, as did the then State authorities of Texas and Louisiana, that the present law is unconstitutional.

BUREAU OR COMMISSION OF PUBLIC HEALTH BILL.

As an offset to the national quarantine bill, therefore, which still further strengthens the Service, a bill was introduced establishing a commission or bureau of public health, the effect of which is practically to bury the Marine-Hospital Service and to turn over to the new bureau its very offices and all appurtenances and personnel connected with the quarantine service; establishes an advisory council of one from each State to make quarantine regulations, which are to be enforced practically by the State and local authorities. The bill is so drawn as to secure the cooperation of all these various State officers, providing for official positions. It in effect opposes national quarantine, particularly maritime quarantine, which, as I have previously shown, is naturally a function of the Treasury Department, which has complete oversight of commerce from foreign ports in every other respect but this one.

The advocates of this bill claim it represents the medical profession, as indicated by resolutions of the American Medical and American Public Health Association, whereas in its practical destruction of the Marine-Hospital Service it is exactly contrary to the wishes of the American Medical Association, as expressed in the resolution adopted in 1896 at Atlanta. The American Medical Association has always expressed a desire to have a department of public health, with a secretary in the Cabinet. It has been consistent in the demand for nothing less than this until 1896, when its committee, through its chairman, Dr. Jerome Cochran, of Alabama, in a very complete report, declared the establishment of the department impracticable, stating that the law of 1893 had practically converted the Marine-

Hospital Service into a national health department, and advising that "we endeavor to improve the Marine-Hospital Service and make it more satisfactory as a health department than it now is."

The genesis of this bureau of public health bill, whose advocates were given a full hearing before the House committee, and the history of the measure, will be found narrated in detail in the hearing before the committee, February 19, 1898, previously alluded to and published herewith.

A quarantine convention of the South Atlantic and Gulf States, called to study the subject of quarantine in its relation to epidemic diseases in general and to yellow fever especially, met at Mobile, Ala., February 9, 10, and 11, 1898. The organization and management of this convention were notably in the hands of those opposed to the national quarantine law. A decided effort was made to have the bureau of public health bill, already referred to, indorsed, but failed. Neither was Senate bill 2680, already referred to, indorsed. It was this convention which it was hoped by the opponents of the national quarantine law would pass resolutions unfavorably influencing the House committee, whose hearings were continued until after the convention, as previously stated, but the hope was not realized.

Following this convention, and in accordance with one of its resolutions, a subsequent one was held April 12, 1898, in Atlanta, Ga., to agree upon interstate quarantine rules during the prevalence of yellow fever. By request experienced officers of the Marine-Hospital Service were detailed to attend this convention, and I authorized them to present to the appropriate committee the regulations which had been prepared by a board of officers of the Service called to revise the old regulations. The measures adopted by this convention, which met and adjourned the same day, were practically the same as the regulations prepared by this board.

It is no difficult matter for the opponents of the Service to manipulate conventions and associations to a degree, nor would it be difficult, if time and propriety permitted, for the Service to do likewise. I, myself, have attended none of these conventions, which seemed to be called to discuss matters already determined upon by Congress, but I have always sent delegates, experienced officers, to give any necessary information.

In the meantime the Service has been attending strictly to its duties, endeavoring to perform them effectively, and to leave nothing undone required of it by the law.

These duties have required unusual vigilance, leaving no opportunity to engage in medical or political controversies, and even now the time and attention of the service is absorbed in preparation for the work of next summer, when the danger of the introduction of yellow fever into the United States will be greater than heretofore on account of increased intercourse with Cuba. The most pressing needs at pres-

ent are that Congress should favorably act upon the measures which have already been put before it and have been approved by the Treasury Department, and should grant an increase of clerical force in the Bureau. From time to time, as new duties are imposed upon the Bureau, additions to its clerical force must of necessity be made, and if these demands are met promptly by Congress, service can be rendered by the Bureau which will demonstrate the inutility of new and disruptive legislation, so frequently proposed. Estimates for increase in the clerical force have been submitted annually for several years past, I may say persistently, but for various reasons of economy have not been favorably acted upon. They are again submitted, and it is to be hoped that Congress at its next session will give adequate recognition to the needs of the Bureau in connection with increased and still expanding sphere of usefulness of the service.

Following are the quarantine bills now before Congress, with reports of committees, etc.:

SENATE BILL, 2680.

FIFTY-FIFTH CONGRESS, SECOND SESSION.

Introduced by Mr. Caffery, December 7, 1897. Reported by Mr. Vest with amendments, June 19, 1898, as follows:

A BILL amending "An act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service," approved February fifteenth, eighteen hundred and ninety-three.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

* * * * *

That "An act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service," approved February fifteenth, eighteen hundred and ninety-three, be amended by striking out the following words in section one: "And with such rules and regulations of State and municipal health authorities as may be made in pursuance of or consistent with this act," and striking out section three and inserting the following in the place of said section:

"SEC. 3. That immediately after the passage of this act the Secretary of the Treasury shall make such rules and regulations as are necessary to prevent the introduction into the United States of any infectious or contagious disease from any foreign port or place, or the spread of such disease from one State or Territory, or the District of Columbia into another State or Territory, or the District of Columbia, and such necessary rules and regulations as shall be observed by vessels or vehicles departing from foreign ports or places for ports or places in the United States to secure the best sanitary condition of such vessels or vehicles, their cargoes, passengers, and crews, which rules and regulations shall be published and communicated to and enforced by consular, quarantine, and customs officers of the United States and the State and local quarantine officers of the United States. All rules and regulations made by the Secretary of the Treasury shall operate uniformly, so far as climatic conditions will justify, in the interest of the security against the introduction or spread of said infectious and contagious diseases, and shall not discriminate against any port or place. None of the penalties herein imposed shall attach to any vessel from a foreign port, or owner, or officer thereof, until a copy of this act, with the rules and regulations made in pursuance thereof, has been posted up in the office of the consul or other

consular officer of the United States for ten days in the port from which said vessel sailed, and the certificate of such consul or consular officer, over his official signature, shall be competent evidence of such posting in any court in the United States.

"At any port or place in the United States where the Secretary of the Treasury shall deem it necessary for the prevention of the introduction of contagious or infectious disease from a foreign port or place that incoming vessels, vehicles, or persons shall be inspected by a national quarantine officer, such officer shall be designated or appointed by the Secretary of the Treasury on recommendation of the Surgeon-General of the Marine-Hospital Service, and at any such port or place no vessel, vehicle, or person from any foreign port or place shall be admitted to entry or enter without the certificate of said officer that the United States quarantine regulations have been complied with.

"Any vessel sailing from any foreign port without a United States consular bill of health, and arriving within the limits of any collection district of the United States, and not entering or attempting to enter any port of the United States, shall be subject to such quarantine measures as shall be prescribed by regulations of the Secretary of the Treasury, and the cost of such measures shall be a lien on said vessel, to be recovered by proceedings in the proper district court of the United States and in the manner set forth above as regards vessels from foreign ports without bills of health and entering any port of the United States.

"National quarantine stations now in operation shall be conducted in accordance with the provisions of this act, and the Supervising Surgeon-General, with the approval of the Secretary of the Treasury, is authorized to designate and mark the boundaries of the quarantine grounds and quarantine anchorages for vessels which are reserved for use at each United States quarantine station; and any vessel, or officer of any vessel, or other person trespassing upon such grounds or anchorages, in disregard of the quarantine rules and regulations, shall be deemed guilty of a misdemeanor and subject to arrest, and, upon conviction thereof, be punished by a fine of not more than three hundred dollars, or imprisonment for not more than one year, or both, in the discretion of the court.

"And any master or owner of any vessel or any person violating any provision of this act or any rule or regulation made in accordance with this act, relating to inspection of vessels, or relating to the prevention of the introduction of contagious or infectious diseases, and any master, owner, or agent of any vessel making a false statement relative to the sanitary condition of said vessel or its contents, or as to the health of any passenger or person thereon, shall be deemed guilty of a misdemeanor and subject to arrest, and, upon conviction thereof, be punished by a fine of not more than five hundred dollars, or imprisonment for not more than one year, or both, in the discretion of the court.

"Medical officers of the United States, duly clothed with authority to act as quarantine officers at any port or place within the United States, and when performing such duties, are hereby authorized to take declarations and administer oaths in matters pertaining to the administration of the quarantine laws and regulations of the United States.

"The Secretary of the Treasury shall, whenever in his judgment it is necessary, make rules and regulations to prevent the introduction of infectious or contagious diseases into one State or Territory or the District of Columbia from another State, Territory, or the District of Columbia, and when such rules and regulations have been duly made they shall be promulgated by the Secretary of the Treasury and enforced by the sanitary authorities of the States and municipalities when the State or municipal authorities will undertake to execute or enforce them; but if the State or municipal authorities shall fail or refuse to enforce said rules and regulations, or other rules or regulations made under the provisions of this act,

the President shall execute and enforce the same, and adopt such measures as in his judgment shall be necessary to prevent the introduction or spread of such diseases, and may detail or appoint officers for that purpose.

"Whenever yellow fever, cholera, plague, or typhus fever has passed the quarantines of the United States, or in any manner any one of these diseases has gained entrance or has appeared within the limits of any State, Territory, or the District of Columbia, the quarantine regulations of the United States, prepared under the direction of the Secretary of the Treasury, for the purpose of preventing the spread of such diseases from one State, Territory, or the District of Columbia into another State, Territory, or the District of Columbia, shall be supreme and have precedence of State or municipal laws, rules, or regulations, and the President is authorized to enforce the same and to control the movement of vessels, railway trains, vehicles, or persons so as to prevent these diseases from spreading from one State, Territory, or the District of Columbia to another State, Territory, or the District of Columbia, and to prevent unnecessary restrictions upon interstate commerce; and whenever, in accordance with the rules and regulations made as herein authorized to prohibit or permit the movement of vessels, railway trains, and vehicles, or transportation of persons, prohibitions or permits have been made or granted, any person violating said prohibition or permit shall be deemed guilty of a misdemeanor, and shall be subject to a fine of not more than one thousand dollars or imprisonment for not more than twelve months, or both, at the discretion of the court; and any violation of said prohibition or permit shall be reported to the United States district attorney for the district in which the offense has been committed, who shall thereupon institute necessary proceedings for the recovery of the penalty herein imposed."

That section six of said act shall be amended to read as follows:

"That on the arrival of an infected vessel at any port not provided with the proper facilities for treatment of the same, the Secretary may remand said vessel, at its own expense, to the nearest national or other quarantine station where accommodations and appliances are provided for the necessary disinfection and treatment of the vessel, passengers, and cargo; and after treatment of any infected vessel, or inspection of any vessel not infected, at a national quarantine station, and after certificate shall have been given by the United States quarantine officer at said station that the vessel, cargo, and passengers are each and all free from infectious disease or danger of conveying the same, said vessel shall be permitted to enter and admitted to entry at any port of the United States named within the certificate. But at any ports where sufficient quarantine provision has been made by State or local authorities, the Secretary of the Treasury shall direct vessels bound for said ports to undergo quarantine at said State or local station."

That section eight of said act shall be amended to read as follows:

"That whenever the proper authorities of a State shall surrender to the United States the use of the buildings, grounds, and disinfecting apparatus at a State or municipal quarantine station, the Secretary of the Treasury shall be authorized to purchase them at a reasonable compensation, or pay a reasonable rental for their use, if in his opinion they are necessary to the United States; and the expense of said purchase or rental is made payable from the epidemic fund.

"That the Surgeon-General of the Marine-Hospital Service shall, whenever he may deem it necessary, appoint in each port exposed to yellow fever, or where such disease has ever been introduced, a port sanitary inspector, who shall have been a practicing physician for at least five years before his appointment at said port, and who shall be familiar with the symptoms of the disease hereinbefore mentioned, and skilled in its prevention and treatment.

"It shall be the duty of the port sanitary inspectors or quarantine physicians so appointed to make careful examination of the sanitary condition and surroundings of the ports where they reside and for which they are appointed, and to report

each month, or oftener, if required so to do, the facts as to the sanitary condition of such ports to the Surgeon-General of the Marine-Hospital Service, with such suggestions and recommendations as they may think necessary and proper. The said port sanitary inspectors shall perform such other duties in treating yellow fever or other infectious diseases as the Surgeon-General of the Marine-Hospital Service shall direct; and they shall each be paid from the Treasury, upon vouchers signed by the Surgeon-General of the Marine-Hospital Service, the sum of \$1,000 annually, payable, in equal quarterly installments, on the first days of January, April, July, and November."

REPORT OF SENATE COMMITTEE ON THE FOREGOING BILL (S. 2680)
AND ALSO UPON SENATE BILLS 1703 AND 2343.

[Senate Report No. 521, Fifty-fifth Congress, second session.]

The Committee on Public Health and National Quarantine, to which was referred the bill (S. 1703) entitled "A bill to establish a department of public health," also the bill (S. 2343) entitled "A bill to create an executive department to be known as the department of public health, and to prescribe the duties and powers thereof," and the bill (S. 2680) entitled "A bill amending 'An act granting additional quarantine powers and imposing additional duties on the Marine-Hospital Service,' approved February 15, 1893," submit the following report:

In the consideration of these bills the first question to be determined is whether the present system of quarantine under the control of the Marine-Hospital Service shall be abandoned; and, if so, shall there be created an executive department, to be known as "the department of health," with a Cabinet officer at its head, the duties and powers of such department to be those set forth in Senate bill No. 2343, or shall there be established a department of health with an officer in control to be known as the secretary of health, with the powers and duties prescribed in Senate bill No. 1703.

It will be seen by an examination of Senate bill No. 2343 that in addition to creating a new department, with all the machinery incident thereto, it establishes two boards, one to be styled the board of maritime sanitation, to be composed of 22 members, or 1 from each seaboard State, and another to be known as the board of domestic sanitation, composed of 3 members, none of whom shall be appointed from a seaboard State.

The board of maritime sanitation so created is given exclusive control of all matters pertaining to the prevention of the introduction of diseases from foreign countries, and the board of domestic sanitation is given exclusive charge of all domestic quarantine and exclusive power to declare and enforce quarantine between the States and Territories and between the communities of a State or Territory. It also has the power to collect and tabulate the vital statistics of each State. Senate bill No. 1703 creates a department of public health, with an officer at its head to be known as the secretary of health, whose duty it shall be to procure and tabulate statistics as to marriage, births, epidemic and all other diseases, especially those of a degenerative character, such as malignant growths and diseases of the digestive, respiratory, and reproductive organs; also the effect of climate on tubercular disease, and the ruinous effects upon body and mind of intemperance and prostitution.

It is also made the duty of the secretary of public health to investigate the causes of insanity; the condition of the laboring classes; how they are lodged, fed, hours of labor, especially for children, and the hygienic condition of public schoolhouses and factories, and the pollution of streams and wells.

It is also made the duty of the secretary, after conference with the surgeon-generals of the Army and Navy and the Marine-Hospital Service and the State

boards of health, to make rules and regulations for the prevention of the invasion of disease from foreign countries.

It will be seen that both of these bills, although differing in details, agree in taking away the jurisdiction over quarantine matters from the Marine-Hospital Service and vesting it in a department of health.

The committee believes that a change so radical is both impolitic and dangerous.

The Southern States lying upon the Atlantic and Gulf of Mexico are constantly exposed to danger from yellow fever, and the sudden transition from the present quarantine system to a new and untried experiment would leave these States for a time without protection. If a department of health is to be established, it should be done gradually without the sudden transition which would paralyze the efforts of the Marine-Hospital Service and substitute a new and necessarily crude system.

The Marine-Hospital Service has been virulently assailed and charged with tyranny and gross negligence, but no convincing evidence of these statements being true has been placed before the committee. While it is undeniable that the yellow fever, which is the only contagious disease from foreign countries to be really dreaded, entered the United States last summer at a point on the Gulf coast near Ship Island, it has not been satisfactorily shown that this occurred by reason of the carelessness or neglect of the officers on duty at the Ship Island quarantine station. The fever first appeared at Ocean Springs, a few miles from the station, but it is unjust to conclude, on the ground of propinquity alone, that it came through Ship Island. Hundreds of refugees from Havana—the most dangerous yellow-fever port in the world—have been coming to our shores in all sorts of vessels and landing at obscure and out of the way places, where it was impossible, on account of our extended seaboard, to intercept them.

Besides this, it is well known that since the present troubles began in Cuba smuggling has been extensively carried on, and those engaged in it have, of course, carefully avoided the larger ports of the United States, where quarantine regulations are enforced. These observations are made, not with any idea of taking part in the acrimonious controversy between the State boards of health in the Southern States and the Marine-Hospital Service, but because justice demands that our conclusions should be frankly stated as to matters involving not only large pecuniary interests, but also health and life.

In our opinion, it is wise and necessary to retain the present system of quarantine under the management of the Marine-Hospital Service, with its hospitals, quarantine stations, improved apparatus for the investigation of disease germs, and corps of officers, 25 per cent of whom have experience in the prevention and treatment of infectious diseases, and especially of yellow fever.

It may be found expedient hereafter to expand the service into that of a department, but to do so now would mean the useless expenditure of money and the destruction of the only systematic antagonism to the invasion of contagious diseases.

POWERS OF THE MARINE-HOSPITAL SERVICE SHOULD BE ENLARGED.

While we believe that the quarantine jurisdiction of the Marine-Hospital Service should be retained, we are clearly of opinion that its powers should be enlarged and made more distinct and uniform. No timidity nor adherence to technicalities should prevent the adoption of any measures which are necessary to exclude contagious diseases from our shores.

The experience of past years, and especially of the last summer, demonstrate the absolute and immediate necessity of so amending existing laws as to enlarge and concentrate the powers of the Marine-Hospital Service, so that the present sporadic and conflicting condition, in which there is constant friction and colli-

sion between Federal and State officials, shall be changed, and the exclusive, ultimate control be given to one authority.

The evils of the present system have become intolerable.

During the season just ended hundreds of lives were lost by reason of defects in existing law, the commerce of the entire South was paralyzed, and the rights of citizens disregarded by lawless methods. Cities and towns were quarantined against rival communities, producing bitter controversy, and railway trains passing from one State to another were prohibited from proceeding, the passengers in many cases being forcibly taken from the cars and carried to improvised fever camps, where they were exposed to hardship and contagion.

The amount of damage inflicted upon the country by the shotgun quarantine can never be accurately stated, but it certainly amounted to many millions, and the possibility of its existence is a stigma upon our institutions and civilization.

CONSTITUTIONAL QUESTION.

It is assumed that objection will be made on constitutional grounds to that portion of the bill favorably reported, which provides as follows:

"Whenever yellow fever, cholera, plague, or typhus fever has passed the quarantines of the United States, or in any manner any one of these diseases has gained entrance or has appeared within the limits of any State, Territory, or the District of Columbia, the quarantine regulations of the United States, prepared under the direction of the Secretary of the Treasury, for the purpose of preventing the spread of such diseases from one State, Territory, or the District of Columbia into another State, Territory, or the District of Columbia, shall be supreme and have precedence of State or municipal laws, rules, or regulations, and the President is authorized to enforce the same and to control the movements of vessels, railway trains, vehicles, or persons so as to prevent these diseases from spreading from one State, Territory, or the District of Columbia to another State, Territory, or the District of Columbia, and to prevent unnecessary restrictions upon interstate commerce; and whenever, in accordance with the rules and regulations made as herein authorized to prohibit or permit the movement of vessels, railway trains, and vehicles, or transportation of persons, prohibitions or permits have been made or granted, any person violating said prohibition or permit shall be deemed guilty of a misdemeanor, and shall be subject to a fine of not more than \$1,000 or imprisonment for not more than twelve months, or both, at the discretion of the court; and any violation of said prohibition or permit shall be reported to the United States district attorney for the district in which the offense has been committed, who shall thereupon institute necessary proceedings for the recovery of the penalty herein imposed."

It is interesting to note in the legislation of Congress the gradual approach to the full conviction that there must be one supreme head to the quarantine system.

The first act of Congress, approved April 29, 1878, entitled "An act to prevent the introduction of contagious or infectious diseases into the United States," was careful to declare that "there shall be no interference in any manner with any quarantine laws or regulations as they now exist or may hereafter be adopted under State laws."

On March 3, 1879, a National Board of Health was created, consisting of seven members to be appointed by the President, and one medical officer from the Army, one from the Navy, one from the Marine-Hospital Service, and an officer from the Department of Justice, whose duty it shall be to obtain information on all matters affecting the public health, and to advise the Executive Departments, the governors of States, and the Commissioners of the District of Columbia upon all questions submitted to them, or whenever in the opinion of the board such advice may tend to improve the public health.

On March 27, 1890, Congress enacted as follows:

AN ACT to prevent the introduction of contagious diseases from one State to another and for the punishment of certain offenses.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That whenever it shall be made to appear to the satisfaction of the President that cholera, yellow fever, smallpox, or plague exists in any State or Territory, or in the District of Columbia, and that there is danger of the spread of such disease into other States, Territories, or the District of Columbia, he is hereby authorized to cause the Secretary of the Treasury to promulgate such rules and regulations as in his judgment may be necessary to prevent the spread of such disease from one State or Territory into another, or from any State or Territory into the District of Columbia, or from the District of Columbia into any State or Territory, and to employ such inspectors and other persons as may be necessary to execute such regulations to prevent the spread of such disease. The said rules and regulations shall be prepared by the Supervising Surgeon-General of the Marine-Hospital Service, under the direction of the Secretary of the Treasury. And any person who shall willfully violate any rule or regulation so made and promulgated shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not more than five hundred dollars, or imprisonment for not more than two years, or both, in the discretion of the court.

SEC. 2. That any officer, or person acting as an officer, or agent of the United States at any quarantine station, or other person employed to aid in preventing the spread of such disease, who shall willfully violate any of the quarantine laws of the United States, or any of the rules and regulations made and promulgated by the Secretary of the Treasury as provided for in section one of this act, or any lawful order of his superior officer or officers, shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not more than three hundred dollars or imprisonment for not more than one year or both, in the discretion of the court.

SEC. 3. That when any common carrier or officer, agent, or employee of any common carrier shall willfully violate any of the quarantine laws of the United States, or the rules and regulations made and promulgated as provided for in section one of this act, such common carrier, officer, agent, or employee shall be deemed guilty of a misdemeanor, and shall, on conviction, be punished by a fine of not more than five hundred dollars, or imprisonment for not more than two years, or both, in the discretion of the court.

Approved, March 27, 1890.

This act virtually abolished the National Board of Health, which had been substituted for the Marine-Hospital Service, but on February 13, 1893, the National Board of Health was formally abolished, and the jurisdiction over quarantine matters again given to the Marine-Hospital Service.

It will be seen that the act of March 27, 1890, before set forth, goes as far substantially in giving exclusive and supreme power over domestic quarantine to Federal authority as does the bill reported by the committee, but so far as we know the constitutionality of that act has never been questioned.

Beginning with the case of *Gibbons v. Ogden*, in 9 Wheaton, a large number of decisions have been rendered by the Supreme Court of the United States as to quarantine powers of Federal and State governments, but the substance of all these opinions is expressed by Justice Davis in *Peete v. Morgan* (19 U. S., 581):

"That the power to establish quarantine law rests with the States and has not been surrendered to the General Government is settled in *Gibbons v. Ogden*.

"The source of this power is in the acknowledged right of a State to provide for

the health of its people, and although this power when set in motion may in a greater or less degree affect commerce, yet the laws passed in the exercise of this power are not enacted for such an object. They are enacted for the sole purpose of preserving the public health, and if they injuriously affect commerce, Congress, under the power to regulate it, may control them."

In the case of *Morgan Steamship Company v. Louisiana*, involving the constitutionality of a Louisiana statute for collection of quarantine fees (118 U. S., 465), Mr. Justice Miller, delivering the opinion of the court (Mr. Justice Bradley alone dissenting), used this language:

"Whenever Congress shall undertake to provide a general system of quarantine all the State laws inconsistent with said enactment will be abrogated, but until this is done the laws of the State on the subject are valid."

Mr. Justice Miller also said in this case:

"For while it (the statute of Louisiana in question) may be a police regulation in the sense that all provisions for the health, comfort, and security of the citizens are police regulations and are an exercise of the police power, it has been said more than once in this court that even where such powers are so exercised as to come within the domain of Federal authority as defined by the Constitution, the latter must prevail. (*Gibbons v. Ogden*, 9 Wheat., 1; *Henderson v. Mayor*, 92 U. S., 259; *New Orleans Gas Co. v. La. Lgt. Co.*, 115 U. S.)"

In the case of *Hannibal and St. Joe Railway v. Husen* (95 U. S., 465), a statute of Missouri prohibiting the driving or conveying of any Texas, Indian, or Mexican cattle into the State between March 1 and November 1 of each year was declared unconstitutional. Mr. Justice Strong, delivering the opinion of the court (which was unanimous), said:

"While we unhesitatingly admit that a State may pass sanitary laws and laws for the protection of life, liberty, health, or property within its borders; while it may prohibit persons and animals suffering under contagious or infectious diseases, or convicts, etc., from entering the State, while for the purposes of self-protection it may establish quarantine and reasonable inspection laws, it may not interfere with transportation into or through the State, beyond what is absolutely necessary for its self-protection."

Under the decision in *Peete v. Morgan and Morgan Steamship Company v. Louisiana* it is clear that Congress has the power to control the operation of State quarantine laws when, in its opinion, they injuriously affect commerce among the States, and whenever Congress enacts a general quarantine law all State laws in conflict with it are abrogated.

A practical illustration of the exercise of this Federal jurisdiction is found in the acts of July 18, 1888, and May 2, 1889, under which the Bureau of Animal Industry is authorized to enter any State where cattle are infected with pleuropneumonia, and, without consulting State authorities or laws, purchase and destroy the suspected animals.

It would be strange indeed if, when a State refuses or neglects to make proper laws and regulations against contagious disease, Congress must stand helpless while commerce among States is destroyed and our citizens slaughtered by an epidemic.

The committee, with a deep sense of the responsibility resting upon them, after earnest inquiry and deliberation, recommend the passage of the substitute for Senate bill No. 2680.

Senator Mallory dissents from the conclusions of a majority of the committee.

HOUSE BILL 4363.

FIFTY-FIFTH CONGRESS, SECOND SESSION.

Introduced by Mr. Hepburn, December 9, 1897. Reported with amendments April 30, 1898, as follows:

To conform with the original bill the number of page and line number will be indicated as follows: Page number by black figures in brackets; line number by light figures in brackets.

A BILL amending "An act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service," approved February fifteenth, eighteen hundred and ninety-three.

[1] *Be it enacted by the Senate and House of Representa-* [2] *tives of the United States of America in Congress assembled,* [3] That "An act granting additional powers and [4] imposing additional duties upon the Marine-Hospital Service," [5] approved February fifteenth, eighteen hundred and ninety- [6] three, be amended by striking out the following words in sec- [7] tion one: "And with such rules and regulations of State and [8] municipal health authorities as may be made in pursuance of [9] or consistent with this act," and striking out section three [10] and inserting the following in the place of said section:

[11] "Sec. 3. That immediately after the passage of this act [12] the Secretary of the Treasury shall make such rules and regu- [2] [1] lations as are necessary to prevent the introduction into the [2] United States of any infectious or contagious disease from any [3] foreign port or place, or the spread of such diseases from one [4] domestic port to another, and such necessary rules and regu- [5] lations as shall be observed by vessels or vehicles departing [6] from foreign ports or places for ports or places in the United [7] States to secure the best sanitary condition of such vessels or [8] vehicles, their cargoes, passengers, and crews, which rules [9] and regulations shall be published and communicated to [10] and enforced by consular, quarantine, and customs officers [11] of the United States and the State and local quarantine [12] officers of the United States. All rules and regulations made [13] by the Secretary of the Treasury shall operate uniformly, so [14] far as climatic conditions will justify, in the interest of [15] security against the introduction or spread of said infectious [16] and contagious diseases, and shall not discriminate against [17] any port or place. None of the penalties herein imposed [18] shall attach to any vessel from a foreign port, or owner or [19] officer thereof, until a copy of this act, with the rules [20] and regulations made in pursuance thereof, has been posted [21] up in the office of the consul or other consular officer of the [22] United States for ten days in the port from which said vessel [23] sailed, and the certificate of such consul or consular officer, [24] over his official signature, shall be competent evidence of such [25] posting in any court of the United States.

[3] [1] "At any port or place in the United States where the [2] Secretary of the Treasury shall deem it necessary for the [3] prevention of the introduction of contagious or infectious [4] disease from a foreign port or place that incoming vessels, [5] vehicles, or persons shall be inspected by a national quaran- [6] tine officer, such officer shall be designated or appointed by [7] the Secretary of the Treasury, on recommendation of the [8] Surgeon-General of the Marine-Hospital Service, and at any [9] such port or place no vessel, vehicle, or person from a foreign [10] port or place shall be admitted to entry or enter without the [11] certificate of said officer that the United States quarantine [12] regulations have been complied with.

[13] "Any vessel sailing from any foreign port without a [14] United States consular bill of health, and arriving within the [15] limits of any collection district

of the United States, and not [16] entering or attempting to enter any port of the United States, [17] shall be subject to such quarantine measures as shall be pre- [18] scribed by regulations of the Secretary of the Treasury, and [19] the cost of such measures shall be a lien on said vessel, to be [20] recovered by proceedings in the proper district court of the [21] United States and in the manner set forth above as regards [22] vessels from foreign ports without bills of health and enter- ing [23] any port of the United States.

[24] "National quarantine stations now in operation shall be [25] conducted in accordance with the provisions of this act, and [1] [1] the Supervising Surgeon-General, with the approval of the [2] Secretary of the Treasury, is authorized to designate and mark [3] the boundaries of the quarantine grounds and quarantine [4] anchorages for vessels, which are reserved for use at each [5] United States quarantine station; and any vessel, or officer of [6] any vessel, or other person, trespassing upon such grounds or [7] anchorages, in disregard of the quarantine rules and regula- [8] tions, shall be deemed guilty of a misdemeanor and subject to [9] arrest, and, upon conviction thereof, be punished by a fine of [10] not more than three hundred dollars, or imprisonment for not [11] more than one year, or both, in the discretion of the court.

[12] "And any master or owner of any vessel, or any person [13] violating any provision of this act or any rule or regulation [14] made in accordance with this act, relating to inspection of [15] vessels, or relating to the prevention of the intro- duction of [16] contagious or infectious disease, and any master, owner, or [17] agent of any vessel making a false statement relative to the [18] sanitary condition of said vessel or its contents, or as to the [19] health of any passenger or person thereon, shall be deemed [20] guilty of a misdemeanor and subject to arrest, and, upon con- [21] viction thereof, be punished by a fine of not more than five [22] hundred dollars, or imprisonment for not more than one year, [23] or both, in the discretion of the court.

[24] "Medical officers of the United States, duly clothed with [25] authority to act as quarantine officers at any port or place [5] [1] within the United States, and when performing such duties, [2] are hereby authorized to take declarations and administer [3] oaths in matters pertaining to the administration of the [4] quarantine laws and regulations of the United States.

[5] "The Secretary of the Treasury shall, whenever in his [6] judgment it is necessary, make rules and regulations to pre- [7] vent the introduction of infec- tious or contagious diseases into [8] one State or Territory, or the District of Columbia, from an- [9] other State, Territory, or the District of Columbia, and when [10] such rules and regulations have been made they shall be pro- [11] mulgated by the Secretary of the Treasury and enforced by [12] the sanitary authorities of the States and municipalities when [13] the State or municipal authorities will undertake to execute [14] or enforce them; but if the State or municipal authorities [15] shall fail or refuse to enforce said rules and regulations, or [16] other rules or regulations made under the provisions of this [17] act, the President shall execute and enforce the same, and [18] adopt such measures as in his judgment shall be necessary to [19] prevent the introduction or spread of such diseases, and may [20] detail or appoint officers for that purpose: *Provided, how- ever,* [21] That nothing in this act contained shall be so construed as to [22] authorize the Secretary of the Treasury to interfere with the [23] State or municipal authorities in the regulation of local [24] affairs so long as the introduction and spread of diseases are [25] properly controlled and treated: *Provided further,* That there [6] [1] shall be no interference with authorized medical officers [2] charged with the duty of carrying out the authorized regula- [3] tions, who shall be permitted to freely pass with such property [4] and appliances as may be designated in such regulations, [5] from State to State and from point to point in

a State, and [6] remain at such points as long as may be deemed necessary to [7] properly control all infected places and treat such infection [8] and prevent the spread of the same.

[9] "Whenever yellow fever, cholera, plague, or typhus [10] fever has passed the quarantines of the United States, or in [11] any manner any one of these diseases has gained entrance or [12] has appeared within the limits of any State, Territory, or the [13] District of Columbia the quarantine regulations of the United [14] States, prepared under the direction of the Secretary of the [15] Treasury, shall be supreme and have precedence of State or [16] municipal quarantine laws, rules, or regulations, and the Presi- [17] dent is authorized to enforce the same within the limits of [18] any State, Territory, or the District of Columbia, and to control [19] the movement of vessels, railway trains, vehicles, or persons [20] within any State, Territory, or the District of Columbia, to [21] prevent these diseases from spreading from one State, Territory, [22] or the District of Columbia, to another State, Territory, or the [23] District of Columbia, and to prevent unnecessary restrictions [24] upon interstate commerce; and whenever, in accordance with [25] the rules and regulations made as herein authorized to prohibit [7] [1] or permit the movement of vessels, railway trains, and [2] vehicles, or transportation of persons, prohibitions or permits [3] have been made or granted, any persons violating said prohi- [4] bition or permit shall be deemed guilty of a misdemeanor, [5] and shall be subject to a fine of not more than five hundred [6] dollars, or imprisonment for not more than twelve months, or [7] both, at the discretion of the court; and any violation of said [8] prohibition or permit shall be reported to the United States [9] district attorney for the district in which the offense has been [10] committed, who shall thereupon institute necessary proceed- [11] ings for the recovery of the penalty herein imposed."

[12] That section six of said act shall be amended to read as [13] follows:

[14] "That on the arrival of an infected vessel at any port [15] not provided with proper facilities for treatment of the same, [16] the Secretary of the Treasury may remand said vessel, at its [17] own expense, to the nearest national or other quarantine [18] station, where accommodations and appliances are pro- [19] vided for the necessary disinfection and treatment of the [20] vessel, passengers, and cargo; and after treatment of [21] any infected vessel, or inspection of any vessel not [22] infected at a national quarantine station, and after certificate [23] shall have been given by the United States quarantine officer [24] at said station that the vessel, cargo, and passengers are each [25] and all free from infectious disease, or danger of conveying [8] [1] the same, said vessel shall be permitted to enter and admitted [2] to entry at any port of the United States named within the [3] certificate. But at any ports where sufficient quarantine pro- [4] vision has been made by State or local authorities, the Secre- [5] tary of the Treasury may direct vessels bound for said ports [6] to undergo quarantine at said State or local station."

[7] That section 8 of said act shall be amended to read [8] as follows:

[9] "That whenever the proper authorities of a State shall [10] surrender to the United States the use of the buildings, [11] grounds, and disinfecting apparatus at a State or municipal [12] quarantine station, the Secretary of the Treasury shall be [13] authorized to purchase them at a reasonable compensation, or [14] pay a reasonable rental for their use, if in his opinion they [15] are necessary to the United States: and the expense of said [16] purchase or rental is made payable from the epidemic fund.

[17] "That the Surgeon-General of the Marine-Hospital [18] Service shall, whenever he may deem it necessary, appoint [19] in each port exposed to yellow fever, or where such disease [20] has ever been introduced, a port sanitary inspector, who shall [21] have been a practicing physician for at least five years

before [22] his appointment at said port, and who shall be familiar with [23] the symptoms of the disease hereinbefore mentioned, and skilled [24] in its prevention and treatment.

[25] "It shall be the duty of the port sanitary inspectors or [9] [1] quarantine physicians so appointed to make careful exam- [2] ination of the sanitary condition and surroundings of the [3] ports where they reside and for which they are appointed, and [4] to report each month, or oftener, if required so to do, the facts [5] as to the sanitary condition of such ports to the Surgeon- [6] General of the Marine-Hospital Service, with such suggestions [7] and recommendations as they may think necessary and proper. [8] The said port sanitary inspectors shall perform such other [9] duties in treating yellow fever or other infectious diseases as [10] the Surgeon-General of the Marine-Hospital Service shall [11] direct; and they shall each be paid from the Treasury. upon [12] vouchers signed by the Surgeon-General of the Marine- [13] Hospital Service, the sum of fifteen hundred dollars annually, [14] payable, in equal quarterly installments, on the first days of [15] January, April, July, and November."

LETTER OF SECRETARY OF THE TREASURY.

TREASURY DEPARTMENT,
Washington, February 17, 1898.

SIR: I have to acknowledge receipt of your communication of February 2, referring to me a bill (H. R. 4363) amending "An act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service," approved February 15, 1893, requesting me to furnish the committee with suggestions, as I may deem proper, touching the merits of the bill and the propriety of its passage.

In reply to your communication I have to say that under date of December 13, 1897, I indorsed, with my approval, a letter of the Surgeon-General of the Marine-Hospital Service to the Senate Committee on Public Health and National Quarantine, commenting upon the provisions of Senate bill 2690, and recommending its passage. The provisions of the inclosed bill (H. R. 4363) are in the main the same as those of the Senate bill referred to. I am informed by the Surgeon-General of the Marine-Hospital Service that it is necessary to amend the present quarantine law, as indicated by this bill.

With regard to maritime quarantine, the amendments suggested by the bill provide for the framing of national regulations to be effective at every port of the United States, and obviates the necessity of enforcement by the National Government of local regulations which may be unnecessary and inconsistent with the national regulations. The bill authorizes also quarantine inspection at any port or place in the United States where the danger of introduction of contagious disease renders such inspection necessary. Furthermore, the bill gives necessary legal status to the present national quarantine stations: provides necessary penalties for the enforcement of the national quarantine laws; empowers medical officers of the United States, acting as quarantine officers, to administer oaths in matters pertaining to quarantine laws; and provides protection against vessels leaving foreign ports without bills of health and coming within the waters of the United States without the purpose of entering any port. These vessels are liable to convey infection to the United States, and the present national law does not give the necessary authority to obviate this danger.

The bill further provides that the pratique given by national quarantine officers at national quarantine stations, whether to disinfected or inspected vessels, shall be recognized, and provides also for the purchase of such quarantine stations as may be willingly surrendered to the United States Government.

With regard to interstate quarantine, the provisions of the bill are such that when one of four epidemic diseases—yellow fever, cholera, plague, or typhus fever—should unhappily obtain admission to the United States, the regulations made by the Secretary of the Treasury shall have precedence over State and local quarantine regulations. This measure is necessary both for the prevention of the spread of either of these diseases and to prevent unnecessary obstruction to commerce caused by unreasonable regulations imposed by local authorities and from lack of uniformity.

Inasmuch as the present law has been found deficient and difficult of execution, and it is believed that the proposed bill remedies these defects, I have respectfully to recommend that the said bill be enacted into law.

Respectfully, yours,

L. J. GAGE, *Secretary.*

THE CHAIRMAN COMMITTEE ON INTERSTATE AND
FOREIGN COMMERCE, HOUSE OF REPRESENTATIVES.

HEARING BEFORE THE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE OF
THE HOUSE OF REPRESENTATIVES.

SATURDAY, *February 19, 1898.*

The committee met at 10.30 o'clock a. m., Hon. William P. Hepburn in the chair.

STATEMENT OF DR. WALTER WYMAN, SURGEON-GENERAL OF THE UNITED STATES
MARINE-HOSPITAL SERVICE.

Dr. WYMAN. Mr. Chairman, and gentlemen of the committee, with regard to House bill 8280, which was presented to the committee yesterday by Dr. Wingate as representing the views of the American Medical Association, I have to give the following brief history of this bill: For years the American Medical Association, in its desire to enlarge the usefulness, and particularly the dignity of the profession, has declared that there should be a department of public health, with a secretary in the Cabinet. It has aimed at nothing less, and has consistently demanded the secretary in the Cabinet.

At its meeting in May, 1896, at Atlanta, the committee made a full report, canvassed all the means to their end, and finally recommended that the Marine-Hospital Service be enlarged and brought up to the required standard.

A committee of one from each State was appointed to prepare a bill in accordance with the adopted report. Then the chairman of the committee, Dr. Jerome Cochran, died, and Dr. Wingate, of Milwaukee, was appointed in his place. The work of the committee was practically left to three members, and they prepared a bill which was presented at the meeting of the association in June, 1897, in Philadelphia. Copies of the bill were with difficulty obtained, and I myself could obtain one only a day and a half before it was presented to the association. On the last day of the meeting, with only a fraction of the association present, the report was made; but it was received only, and the committee continued. This matter has been set forth in a communication printed in the Boston Medical and Surgical Journal of November 25, 1897, from which I quote as follows:

The bill for a department of public health.

WASHINGTON, *November 15, 1897.*

MR. EDITOR: Will you kindly permit me to correct a statement made in the editorial columns of your esteemed journal of the issue of November 11, 1897, under the caption, "A department of public health." I refer to a statement in

the second paragraph, which reads as follows: "The American Medical Association, at the Philadelphia meeting of this year, adopted a draft for a bill to establish a department of public health." I am informed by the recording secretary of the association, and also by others who were present, that the American Medical Association did not adopt a draft for a bill to establish a department of public health.

The facts regarding the proposed bill, referred to in your editorial, are as follows: At the last meeting of the American Medical Association, the committee of the association on department of public health, through its chairman, Dr. U. O. B. Wingate, of Wisconsin, read a report of the committee, in which was included the draft of a bill providing for a department of public health. The report of the committee was received by the association and the committee continued. As the proposed bill was presented during the last hours of the meeting of the association, when few were present, it was not discussed, adopted, or rejected by the association. An opinion on the merits or demerits of the proposed bill was not expressed by the association. In fact, the American Medical Association the year previous, at the Atlanta meeting, in adopting a report of its committee on department of public health, which report recommended that the committee be authorized to draft a bill which should be in accord with the recommendations of their report, expressed views which are entirely opposite to those embraced in the report of the committee at the last meeting, recommending the proposed bill for a department of public health. It is proper to state that by reason of the death of Dr. Jerome Cochran, the chairman of the committee in 1896, a new chairman was appointed.

You are undoubtedly misled in the statement in your editorial, by the editorial statement in the journal of the association, as was the case with some members present at the last meeting of the American Public Health Association. The statement that the proposed bill was adopted by the American Medical Association was announced at that meeting, which undoubtedly influenced members in voting for it. However, there were only 19 votes for the bill and 7 against it at the meeting of the Public Health Association, whose average membership is about 800.

Very truly, yours,

H. W. AUSTIN, M. D.

[We find that the statements in regard to the American Medical Association contained in the above communication are substantially correct, and publish them with pleasure. Practically, it seems to be a question whether the proposed department of public health should swallow or be swallowed by the Marine-Hospital Service.—ED.]

Notwithstanding the facts as above stated the bill was printed in the Journal of the American Medical Association, and it was editorially announced that it had been adopted by the great American Medical Association, and every subscriber was urged to see his Representative and Senator and urge its passage. Then follows the meeting of the American Public Health Association in Philadelphia in November last, and the same bill is presented to that association, with the statement that it had been adopted by the American Medical Association, and on that statement it was adopted by the Public Health Association by a vote of 19 for to 7 against the resolution, a total of 26 votes out of a membership of over 1,000.

That this bill does not meet with the general approval of the medical profession is seen in the fact that opposing views have been printed editorially in the New York Medical Record, the New York Medical News, the New York Medical Journal, the Sanitarian, of Brooklyn, the Philadelphia Medical Journal, the Georgia Journal of Medicine and Surgery, and the Bulletin of the North Carolina Board of Public Health. Also by resolutions adopted by the Tristate Medical Society, representing the States of Alabama, Tennessee, and Georgia; and by a

communication from the president of the Connecticut Medical Society and member of the Connecticut State board of health.

I also have here a copy of an editorial in the New York Herald of February 12, 1898, commending the House bill introduced by Mr. Hepburn.

And I would further invite your attention to the report of the Senate Committee on Public Health and National Quarantine, Report No. 531, January 3, 1898, accompanying Senate bill 2680, approving said bill, which is practically the same as House bill 4363, introduced by Mr. Hepburn, and also two resolutions passed by the senate and house of representatives of the State of Georgia.

This Wingate bill practically disorganizes the Marine-Hospital Service, deprives it of its quarantine functions, makes no advance in national quarantine, and permits the injection of politics into what should be a purely scientific organization. It appears even to authorize the representatives of State boards of health to have a voice in the management of the Marine-Hospital Service, as it transfers it to the commission.

At the present time the Wingate bill represents the views of the gentlemen who drew it up. An effort was made to have it indorsed at the recent quarantine convention at Mobile, but the effort failed. The American Medical Association has not yet passed upon it, and since its approval by the American Public Health Association by an absurdly small vote, it has been altered in many of its essential features, and therefore has no organized sentiment behind it. On the contrary, the opinions of various medical journals throughout the country, a partial list of which I have given, indicate an entirely opposite opinion. In the city represented by Health Officer Doty (New York) the four leading medical journals published there, known throughout the United States and the world, express entirely opposite views.

With regard to an advisory council, which has been advocated, I have to state that an advisory council, in the matter of making quarantine regulations, is very inadvisable, by reason of the fact that the very term "advisory" is misleading. The council as provided in the Wingate bill (H. R. 8280; Senate bill 3433) is not an advisory council, but is a body which will have the making of the quarantine regulations.

The theory advanced by the gentlemen yesterday that there would be no difficulty in carrying into effect the United States quarantine regulations, provided the State health officers made them, was not demonstrated last summer, when the State boards were unable to enforce their own regulations or exercise the proper control over the local boards. Each local board seems to be a law unto itself, and State health officers were not permitted to visit certain towns or localities. In other words, their advice and their rules were disregarded.

If an advisory council were to make the rules and regulations, then the interior States, which outnumber the coast States, would have a dominant influence in the making of rules for maritime quarantine, outvoting the maritime States, and they might make these rules very oppressive. The sanitary and commercial interests of Northern and Southern coast and interior States are not identical, and would not the rules and regulations for maritime and interstate quarantine adopted by the various State health officers be compromise measures or either insufficient or discriminating?

Again, with regard to the interior States, whose representatives would have a majority in an advisory council, said representatives have no practical experience in maritime quarantine.

Even if the maritime quarantine regulations were to be prepared by the representatives from State boards of health representing coast States, it does not follow that these officers would be men specially fitted by experience for this work. Of the twenty-two maritime States, in only six of them does the State board of

health pretend to make maritime quarantine regulations; in the others it is left to the local quarantine officers, and these officers would be far more competent to pass upon maritime regulations than the representatives of the State boards of health. Moreover, if these State officers were to make the maritime quarantine regulations, the situation would be that a body of State officers appointed in the several States, frequently by political preference, would be making regulations to be executed by regular medical officers of this Government, appointed after a most thorough examination, as required by United States statutes, and commissioned by the President and confirmed by the Senate.

Quarantine regulations properly belong to the Treasury Department, which has the oversight of all other matters relating to commerce.

To illustrate: Chicago and St. Louis, or Illinois and Missouri, are not detrimentally affected commercially if a long period of detention at quarantine is required of vessels from yellow-fever ports at the quarantines of New Orleans, Mobile, or Galveston. On the contrary, the latter places and States in which they are located are affected. In point of fact, would not some of the Northern States be benefited commercially by an unnecessarily long detention of vessels arriving at these Southern ports?

Then, too, the governors of the various States (who are frequently changed) hold different views as to how far national authority should be exercised in matters pertaining to quarantine, and would see that the members of the State boards of health representing their States in the advisory council should be those who hold views the same as their own. In fact, the provision in the bill which gives the State health officers the power to make quarantine regulations relegates all quarantine authority now existing under the United States statutes back to the States.

Under this provision the medical offices of the Marine-Hospital Service, who have had long experience in quarantine matters, would have nothing whatever to do with the formulation of quarantine regulations.

Practically the Treasury quarantine regulations are not made by the Secretary of the Treasury or the Supervising Surgeon-General alone. The Surgeon-General has associated with him a staff of officers, many of whom are men whose experience in quarantine matters, both North and South, is unsurpassed, and men whose scientific attainments in the investigation of the cause of infectious diseases are on a par with the most advanced students of the day.

I submit that making quarantine regulations by men of scientific attainments, familiar with actual working details at quarantine stations, familiar with all matters pertaining to immigrants, and, too, with the complicated machinery of governmental methods and associated services in Washington, that this method is superior to that suggested in the proposed bill, with an advisory council, unacquainted with one another, and unfamiliar with governmental methods and existing branches of the Executive Departments.

In framing regulations the Marine-Hospital Bureau, besides its own scientific and practical officers, has the assistance of the law officer of the Treasury Department, detailed from the Department of Justice, and the benefit of the counsel and advice of the heads of the several divisions in the Treasury Department conversant with all the executive and legal details which might require consideration, and, finally, of the Assistant Secretary and the Secretary of the Treasury himself. It is difficult to conceive of any question connected with quarantine regulations which can not be decided properly and promptly by the Marine-Hospital Service and the Treasury Department, to which it belongs.

In discussing House bill 4363 it is necessary to compare its provisions with those of the act of February 15, 1893, which it amends.

The first amendment to the act of 1893 provides that in section 1 the following

words shall be stricken out, viz, "and with such rules and regulations of State and municipal health authorities as may be made in pursuance of or consistent with this act." The effect of this amendment is to obviate the necessity of the National Government enforcing unnecessary quarantine rules and regulations made by State and local authorities.

The second amendment to the act of 1893 consists in striking out entirely section 3 and substituting a new section 3 in its place. Both the old section 3 and the new section 3 relate to two different forms of quarantine—one maritime and the other interstate. It will be necessary to consider them separately.

The Hepburn bill requires the Secretary of the Treasury to make such rules and regulations as are necessary to prevent the introduction into the United States of any infectious or contagious disease from any foreign port or place. The present law (1893) provides that the Secretary of the Treasury shall make regulations for ports in the United States where there are no quarantine regulations provided by the State or local authorities; and for ports where the quarantine regulations are deemed insufficient, the Secretary is authorized to make additional rules and regulations.

The necessity of the amendment is apparent from the fact that at some ports where local quarantines are maintained the health authorities have formulated no regulations, but the health officer or quarantine physician is authorized to exercise his judgment in matters pertaining to quarantine. It is therefore necessary, in order to obtain uniformity in quarantine rules at the various ports of the United States, that the General Government be authorized to prepare quarantine regulations which shall be observed at all ports of entry without reference to local quarantine regulations.

Section 3 of the present law (1893) further requires that all these rules and regulations shall be executed by the State or municipal authorities when they will undertake to execute or enforce them, but if they fail or refuse the President shall execute and enforce them and adopt such measures as in his judgment shall be necessary. Under the terms of the Hepburn bill practically the same provisions exist; but it is further provided on page 3, first twelve lines, that at any port or place in the United States where the Secretary of the Treasury shall deem it necessary that incoming vessels should be inspected by a national quarantine officer, such officer shall be designated. The necessity for this provision lies in the fact that under the present law too much time and opportunity for dispute as to whether the regulations have failed of enforcement is permitted before the President can be called upon to act. This portion of the bill also provides necessary law for the establishment of national quarantine on the Canadian and Mexican borders. The Government should be in position to have actual knowledge of whether the national quarantine rules and regulations are being enforced at all times by State and municipal health officers.

Further provisions for maritime quarantine in the bill of Mr. Hepburn, and which are not included in the present law, are as follows:

First. On page 3, lines 13 to 23, inclusive: This paragraph is intended to authorize such sanitary measures as may be necessary with regard to vessels from foreign ports coming within the waters of the United States without a bill of health and not entering, or attempting to enter, any port of the United States. It is intended particularly to prevent the introduction of contagious diseases, particularly from Cuban and other West Indian ports, by vessels engaged in smuggling. These vessels are generally from Havana, and lie in the worst portion of that infected port, and their crews are frequently new recruits from Spain, not acclimated to yellow fever, and are liable to have this disease and to communicate it either to other vessels or to the shores of the United States where smuggling may be carried on.

Second. Page 3, lines 24 and 25, and page 4, lines 1 to 5, inclusive: This provision is to give definite and distinct character to the quarantine stations of the United States which have been established in the last ten or twelve years under previous laws, and to definitely fix their status.

Third. The remainder of page 4, with the exception of the last two lines, provides the penalties necessary for the proper enforcement of the law.

Fourth. Lines 24 and 25 of page 4, and 1 to 4, inclusive, of page 5, authorize the medical officers of the United States to administer oaths in matters pertaining to the administration of the quarantine laws and regulations.

With regard to the interstate features of the Hepburn bill, beginning at line 5, on page 5, the portion thereof included in lines 5 to 20 is practically the same as in the present law, with the exception that the General Government is not obliged to enforce the local quarantine rules and regulations, many of which are absurd, the enforcement of which would render nugatory the regulations of the Government.

The remainder of page 5 and page 6 relates particularly to occasions when the country is so unfortunate as to have had admitted yellow fever, cholera, plague, or typhus fever.

To enable the General Government to do effective quarantine work at such times, it is necessary that the rules and regulations of the Government be made supreme. It is possible under the existing law for the local quarantines of the various small cities in the interior to prevent the carrying out of necessary measures adopted by the General Government, and also to completely paralyze commercial intercourse between the States. This was clearly demonstrated in the recent epidemic of yellow fever in the South, where the local quarantine authorities prevented the United States inspectors, and even State health officers, from entering the towns where fever was prevailing, and also prevented the shipment of supplies and the movement of necessary camp equipage. Effective work in times of epidemics can not be brought about except there is uniformity of regulation, and authority to carry the same into effect.

Section 6, page 7, of the Hepburn bill is the same as section 6 of the present law, with the single exception that the pratique of the national quarantine officer is made effective regarding vessels inspected as well as vessels which have been disinfected.

Section 8, pages 7 and 8, of the Hepburn bill is the same as in the present law, except that it provides for the purchase as well as rental of State or local quarantines and means of paying for the same.

In conclusion I have to state that the present bill corrects defects in the present law which have been demonstrated since the law of 1893 was passed, and I am of the opinion that the law should be amended as indicated by the bill H. R. 4363.

REPORT OF HOUSE COMMITTEE ON HOUSE BILL 4363.

[House of Representatives. Report No. 1238. Fifty-fifth Congress, second session.]

GRANTING ADDITIONAL QUARANTINE POWERS, ETC., UPON MARINE-HOSPITAL SERVICE.

The Committee on Interstate and Foreign Commerce, to whom was referred the bill (H. R. 4363) entitled "A bill amending 'An act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service,' approved February 15, 1893," having had the same under careful consideration, respectfully submit the following report and recommendation:

In the consideration of this important measure your committee were urged to

consider the advisability of the establishment of a national board of health, or the creation of a department of health entirely separate from the Marine-Hospital Service; but from the evidence submitted, in the opinion of the committee the public health and interests would be best subserved by retaining the present system of quarantine under the management of the Marine-Hospital Service with its hospitals, quarantine stations, improved apparatus for the investigation of disease germs, and corps of efficient officers, many of whom have had experience in the prevention and treatment of infectious diseases, and especially of yellow fever. The expansion of this service sufficient to properly perform the quarantine requirements of the proposed measure may be made without the expenditure of a large amount of money, and insure the efficient performance of the service.

The unfortunate experience of last year in the treatment of yellow fever demonstrates the absolute and immediate necessity of so amending existing laws as to enlarge the powers of the Marine-Hospital Service in such manner as to destroy the constant friction and collision between Federal and State officials, for the evils of the present system have become intolerable.

During the season just ended hundreds of lives were lost by reason of defects in existing law, the commerce of the entire South was paralyzed, and the rights of citizens disregarded by lawless methods. Cities and towns were quarantined against rival communities, producing bitter controversy, and railway trains passing from one State to another were prohibited from proceeding, the passengers in many cases being forcibly taken from the cars and carried to improvised fever camps, where they were exposed to hardship and contagion.

The amount of damage inflicted upon the country by the shotgun quarantine can never be accurately stated, but it certainly amounted to many millions, and the possibility of its existence is a stigma upon our institutions and civilization.

CHANGES PROPOSED.

In the consideration of this measure it is necessary to compare its provisions with those of the act of February 15, 1893, which it amends.

The first amendment to the act of 1893 provides that in section 1 the following words shall be stricken out, viz, "and with such rules and regulations of State and municipal health authorities as may be made in pursuance of or consistent with this act." The effect of this amendment is to obviate the necessity of the National Government enforcing unnecessary quarantine rules and regulations made by State and local authorities.

The second amendment to the act of 1893 consists in striking out entirely section 3 and substituting a new section 3 in its place. Both the old section 3 and the new section 3 relate to two different forms of quarantine—one maritime and the other interstate. It will be necessary to consider them separately.

This bill requires the Secretary of the Treasury to make such rules and regulations as are necessary to prevent the introduction into the United States of any infectious or contagious disease from any foreign port or place. The present law (1893) provides that the Secretary of the Treasury shall make regulations for ports in the United States where there are no quarantine regulations provided by the State or local authorities, and for ports where the quarantine regulations are deemed insufficient the Secretary is authorized to make additional rules and regulations.

The necessity of the amendment is apparent from the fact that at some ports where local quarantines are maintained the health authorities have formulated no regulations, but the health officer or quarantine physician is authorized to exercise his judgment in matters pertaining to quarantine. It is therefore necessary, in order to obtain uniformity in quarantine rules at the various ports of the United States, that the General Government be authorized to prepare quarantine regu-

lations which shall be observed at all ports of entry without reference to local quarantine regulations.

Section 3 of the present law (1893) further requires that all these rules and regulations shall be executed by the State or municipal authorities when they will undertake to execute or enforce them, but if they fail or refuse the President shall execute and enforce them and adopt such measures as in his judgment shall be necessary. Under the terms of this bill practically the same provisions exist but it is further provided, on page 3, first twelve lines, that at any port or place in the United States where the Secretary of the Treasury shall deem it necessary that incoming vessels should be inspected by a national quarantine officer, such officer shall be designated. The necessity for this provision lies in the fact that under the present law too much time and opportunity for dispute as to whether the regulations have failed of enforcement is permitted before the President can be called upon to act. This portion of the bill also provides necessary law for the establishment of national quarantine on the Canadian and Mexican borders. The Government should be in position to have actual knowledge of whether the national quarantine rules and regulations are being enforced at all times by State and municipal health officers.

Further provisions for maritime quarantine in this bill, and which are not included in the present law, are as follows:

First. On page 3, lines 13 to 23, inclusive. This paragraph is intended to authorize such sanitary measures as may be necessary with regard to vessels from foreign ports coming within the waters of the United States without a bill of health and not entering, or attempting to enter, any port of the United States. It is intended particularly to prevent the introduction of contagious diseases, particularly from Cuban and other West Indian ports, by vessels engaged in smuggling. These vessels are generally from Havana, and lie in the worst portion of that infected port, and their crews are frequently new recruits from Spain, not acclimated to yellow fever, and are liable to have this disease and to communicate it either to other vessels or to the shores of the United States where smuggling may be carried on.

Second. Page 3, lines 24 and 25, and page 4, lines 1 to 5, inclusive. This provision is to give definite and distinct character to the quarantine stations of the United States which have been established in the last ten or twelve years under previous laws, and to definitely fix their status.

Third. The remainder of page 4, with the exception of the last two lines, provides the penalties necessary for the proper enforcement of the law.

Fourth. Lines 24 and 25 of page 4, and 1 to 4, inclusive, of page 5, authorize the medical officers of the United States to administer oaths in matters pertaining to the administration of the quarantine laws and regulations.

With regard to the interstate features of this bill, beginning at line 5, on page 5, the portion thereof included in lines 5 to 20 is practically the same as in the present law, with the exception that the General Government is not obliged to enforce the local quarantine rules and regulations, many of which are absurd, the enforcement of which would render nugatory the regulations of the Government.

The committee have suggested an amendment to this paragraph at the end of line 20, for the purpose of sustaining local municipal and State quarantine authorities, so long as the introduction and spread of diseases are properly controlled and treated.

The remainder of page 5 and page 6 relates particularly to occasions when the country is so unfortunate as to have had admitted yellow fever, cholera, plague, or typhus fever.

To enable the General Government to do effective quarantine work at such times, it is necessary that the rules and regulations of the Government be made supreme. It is possible under the existing law for the local quarantines of the various small

cities in the interior to prevent the carrying out of necessary measures adopted by the General Government, and also to completely paralyze commercial intercourse between the States. This was clearly demonstrated in the recent epidemic of yellow fever in the South, where the local quarantine authorities prevented the United States inspectors, and even State health officers, from entering the towns where fever was prevailing, and also prevented the shipment of supplies and the movement of necessary camp equipage. Effective work in times of epidemics can not be brought about except there is uniformity of regulation, and authority to carry the same into effect.

Section 6, page 7, of this bill is the same as section 6 of the present law, with the single exception that the pratique of the national quarantine officer is made effective regarding vessels inspected as well as vessels which have been disinfected,

Section 8, pages 7 and 8, of this is the same as in the present law, except that it provides for the purchase as well as rental of State or local quarantines and means of paying for the same.

In conclusion, I have to state that the present bill corrects defects in the present law which have been demonstrated since the law of 1893 was passed, and I am of the opinion that the law should be amended as indicated by the bill H. R. 4363.

At the end of section 8, page 8, the committee suggest an amendment authorizing the Secretary of the Treasury, on the recommendation of the Surgeon-General, when deemed necessary, to appoint at each port exposed to yellow fever, or where such disease has been introduced, a port sanitary inspector familiar with the symptoms of the disease and skilled in its treatment, as a further precautionary measure.

PURPOSE, SCOPE, AND AUTHORITY.

The pending measure has two provisions. First, the maritime quarantine; second, the interstate quarantine; and they both stand upon the same basis; that is the necessity of uniform and efficient regulation. There is no difference whatever as to the necessity about requiring the same efficient law, the same regular execution of the law, in the case of maritime quarantine and in the case of interstate quarantine.

The purpose of this act is to preserve the public health and maintain the general welfare of the people, and where the municipal or State authorities are able to efficiently cope with infectious, contagious, or epidemic diseases under the rules and regulations of law, their right is to be preserved and supplemented by the aid of the National Government; but in case of an epidemic the strong protective arm of the National Government can be used in the execution of a supreme authority and power over quarantine.

The constitutional right of the Federal Government, in the light of the decisions of the Supreme Court, can not be questioned.

Beginning with the case of *Gibbons v. Ogden*, in 9 Wheaton, a large number of decisions have been rendered by the Supreme Court of the United States as to quarantine powers of the Federal and State governments, but the substance of all these opinions is expressed by Justice Davis in *Peete v. Morgan* (19 U. S., 581):

“That the power to establish quarantine laws rests with the States, and has not been surrendered to the General Government, is settled in *Gibbons v. Ogden*.

“The source of this power is in the acknowledged right of a State to provide for the health of its people, and although this power when set in motion may in a greater or less degree affect commerce, yet the laws passed in the exercise of this power are not enacted for such an object. They are enacted for the sole purpose of preserving the public health, and if they injuriously affect commerce, Congress, under the power to regulate it, may control them.”

In the case of *Morgan Steamship Company v. Louisiana*, involving the constitutionality of a Louisiana statute for collection of quarantine fees (118 U. S.,

465). Mr. Justice Miller, delivering the opinion of the court (Mr. Justice Bradley alone dissenting), used this language:

"Whenever Congress shall undertake to provide a general system of quarantine all the State laws inconsistent with said enactment will be abrogated, but until this is done the laws of the State on the subject are valid."

Mr. Justice Miller also said in this case:

"For while it (the statute of Louisiana in question) may be a police regulation in the sense that all provisions for the health, comfort, and security of the citizens are police regulations and are an exercise of the police power, it has been said more than once in this court that even where such powers are so exercised as to come within the domain of Federal authority as defined by the Constitution, the latter must prevail. (*Gibbons v. Ogden*, 9 Wheat, 1; *Henderson v. Mayor*, 92 U. S., 259; *New Orleans Gas Co. v. La. Lgt. Co.*, 115 U. S.)"

In the case of *Hannibal and St. Joe Railway v. Husen* (95 U. S., 465), a statute of Missouri prohibiting the driving or conveying of any Texas, Indian, or Mexican cattle into the State between March 1 and November 1 of each year was declared unconstitutional. Mr. Justice Strong, delivering the opinion of the court (which was unanimous), said:

"While we unhesitatingly admit that a State may pass sanitary laws and laws for the protection of life, liberty, health, or property within its borders; while it may prohibit persons and animals suffering under contagious or infectious diseases, or convicts, etc., from entering the State; while for the purposes of self-protection it may establish quarantine and reasonable inspection laws, it may not interfere with transportation into or through the State beyond what is absolutely necessary for its self-protection."

Under the decisions in *Peete v. Morgan* and *Morgan Steamship Company v. Louisiana* it is clear that Congress has the power to control the operation of State quarantine laws when, in its opinion, they injuriously affect commerce among the States, and whenever Congress enacts a general quarantine law all State laws in conflict with it are abrogated.

In the recent case of *Hennington v. Georgia* (163 U. S. Reports, p. 309) Justice Harlan, in delivering the opinion of the court, states:

"If the inspection, quarantine, or health laws of a State, passed under its reserved power to provide for the health, comfort, and safety of its people, come into conflict with an act of Congress, passed under its power to regulate interstate and foreign commerce, such local regulations, to the extent of the conflict, must give way in order that the supreme law of the land—an act of Congress passed in pursuance of the Constitution—may have unobstructed operation."

It would be strange, indeed, if, when a State refuses or neglects to make proper laws and regulations against contagious diseases, or provide for their suppression and control, Congress must stand helpless while commerce among the States is destroyed and our citizens slaughtered by an epidemic.

The committee, with a deep sense of the responsibility resting upon them, after earnest inquiry and deliberation, recommend the passage of this measure with the following amendments:

At the end of line 20, page 5, insert the following:

"*Provided, however*, That nothing in this act contained shall be so construed as to authorize the Secretary of the Treasury to interfere with the State or municipal authorities in the regulation of local affairs so long as the introduction and spread of diseases are properly controlled and treated: *Provided further*, That there shall be no interference with authorized medical officers charged with the duty of carrying out the authorized regulations, who shall be permitted to freely pass, with such property and appliances as may be designated in such regulations, from State to State and from point to point in a State, and remain at such points as long as

may be deemed necessary to properly control all infected places and treat such infection and prevent the spread of the same."

At the end of section 8, page 8, add the following:

"That the Secretary of the Treasury, on the recommendation of the Surgeon-General of the Marine-Hospital Service, shall, whenever he may deem it necessary, appoint in each port exposed to yellow fever, or where such disease has ever been introduced, a port sanitary inspector, who shall have been a practicing physician for at least five years before his appointment at said port, and who shall be familiar with the symptoms of the disease hereinbefore mentioned, and skilled in its prevention and treatment.

"It shall be the duty of the port sanitary inspectors or quarantine physicians so appointed to make careful examination of the sanitary condition and surroundings of the ports where they reside and for which they are appointed, and to report each month, or oftener if required so to do, the facts as to the sanitary condition of such ports to the Surgeon-General of the Marine-Hospital Service, with such suggestions and recommendations as they may think necessary and proper. The said port sanitary inspectors shall perform such other duties in treating yellow fever or other infectious diseases as the Surgeon-General of the Marine-Hospital Service shall direct: and they shall each be paid from the Treasury, upon vouchers signed by the Surgeon-General of the Marine-Hospital Service, the sum of fifteen hundred dollars annually, payable in equal quarterly installments on the first days of January, April, July, and November."

[House of Representatives. Report 1238, Part 2. Fifty-fifth Congress, second session.]

ADDITIONAL QUARANTINE, ETC., MARINE-HOSPITAL SERVICE.

VIEWS OF THE MINORITY.

The undersigned, members of the Committee on Interstate and Foreign Commerce, are unable to concur with the majority of that committee in reporting with favorable recommendation the bill amending an act granting additional quarantine powers, etc., approved February 15, 1893, and therefore submit their views, as follows:

We are not willing that the General Government should either assume duties and responsibilities not clearly imposed upon it, or invade the well-settled prerogatives and powers of States and municipalities by seeking to interfere with their efforts to protect their citizens against the dangers of epidemic diseases. With infinitely superior resources, the Federal Government is able to render valuable assistance when communities are battling against the introduction and spread of diseases, but there should be no attempt to prohibit or discourage local authorities from taking all possible precaution and adopting any additional measures for the preservation of the public health.

It may be wise to hold in mind the distinction between quarantine and commerce rather than confound all other considerations with the demands of trade. All quarantine regulations conflict with the absolute freedom of commerce and necessarily operate in restraint thereof, just as disease and death "call a halt" to life and activity, and bid all enterprises of business and profit stop and secure life and safety before seeking the further promotion of commercial interests.

Quarantine is entirely negative and preventive. It may be used by the Government to prevent entrance or movement of person or property. It may be used in the same way by States and municipalities; each authority may prohibit as long as it sees proper; neither authority may properly compel the movement and

admission of persons and property as long as the other authority objects or imposes quarantine. As long as any one or all object there can be no admission. When no authority lays quarantine, then movements are absolutely free.

One authority may be more alert than the other and scent danger where the other fancies perfect security. In such case there can be no question of the right to provide against danger. Quarantine interdicts traffic and travel in the hope of preventing contagion and epidemic. A municipality may impose it when the State in which it is situated may apprehend no danger. So a State may act when the General Government discovers no reason for its own action.

The object of quarantine is not to promote commerce, but to secure life and health by providing against the introduction and spread of contagious diseases, and the regulation of commerce ought not to be utilized as a pretext for legislation which might, whether intended or not, frequently result in breaking down and prohibiting the efforts of the people to protect their health and lives.

Quarantine regulations ought to be considered and adopted with a view, independently and solely, to the suppression of disease and the preservation of life, and not to stimulate money getting. There is no shadow of authority for the attempt, even in the name of commerce, to interfere in matters entirely within a State. There can be no pretense that the Constitution ever authorized that, and statutes to that effect would be utterly void as obnoxious to the Constitution, which restricts the power of Congress to "commerce with foreign nations," "among the States," and "with the Indian tribes," and not within any State.

In accordance with these views, we recommend the following amendments to the bill reported by the majority of the committee:

On fifth page strike out everything inclusive from the word "enforced," eleventh line, to the word "act," in the seventeenth line.

Strike out everything inclusive from the word "provided," in the twentieth line, same page, to the word "with," first line of page 6.

Before the word "authorized," in first line, sixth page, insert the word "the."

After the word "officers," in first line of sixth page, insert "of the United States."

In the third line, sixth page, strike out the word "who."

Strike out all inclusive from line 9, sixth page, to line 11, seventh page, and insert in lieu thereof:

"*Provided*, That nothing in this or any other Federal enactment shall be construed to deny or interfere with the power of States and municipalities to prescribe and enforce additional safeguards of the health of their communities: *Provided further*, That no law of the United States nor regulation adopted by the Secretary of the Treasury shall compel the admission of persons or property into any State, if forbidden by local quarantine, except for the purpose of passing through such State; nor shall Federal law or regulations interfere in any manner with movements of persons or property between different points in the same State, nor with any State or municipal quarantine provision for protection of life and health within its own limits; but the Secretary of the Treasury is authorized, whenever so requested, to aid such State or municipal authorities in enforcing its regulations and preventing the spread of disease."

We hereto append copy of the bill reported, so altered as to show how the entire bill will read when the amendments we propose are made.

Respectfully submitted.

W. C. ADAMSON.
ROBT. W. DAVIS.

DIVISION OF SANITARY REPORTS AND STATISTICS.

This division has prepared weekly the Public Health Reports, issued by the Bureau under the quarantine act of 1893. This publication is divided into two parts, one containing sanitary information relating to the United States and the other similar information concerning foreign countries. The first part is made up of circulars issued by the Department or the Bureau relating to quarantine subjects, information as to the existence of contagious disease in the United States, letters or reports from State and local health officers or from officers of the Service on sanitary subjects, special reports of investigation in the hygienic laboratory or elsewhere, reports from quarantine stations, both national and local; statements of the prevalence of smallpox or yellow fever in the United States, arranged in tabular form; reports of inspection of immigrants; reports of the mortality in States and cities, arranged both by the month and by the week, and a weekly table of temperature and rainfall in the United States, transmitted to this Bureau from the Weather Bureau.

The second portion of the publication consists of foreign sanitary information. The first division of it is a statement in tabular form of cases and deaths occurring throughout the world, excluding the United States, from the following diseases: Cholera, smallpox, yellow fever, and plague. These tables are arranged from reports obtained through American consuls at foreign ports, and from foreign sanitary publications and from sanitary inspectors of this Service on duty at foreign ports. This is followed by translations concerning sanitary affairs, etc., from foreign journals. Then follow reports from consuls, sanitary inspectors, and others concerning the sanitary condition of their respective districts. The report ends with statistical information concerning mortality in foreign cities, both monthly and weekly. The publication is a unique one, there being nothing of exactly the same character published elsewhere. It is distributed to sanitarians in this and other countries, and to United States consuls, and to collectors of customs on the coasts. The volume for 1897, consisting of 53 numbers, comprised 1,441 pages, and is a valuable record of sanitary

statistical information. The current volume is the thirteenth, and will be about as large a volume when completed as the last.

In order to obtain much of the information published in the Public Health Reports it is necessary to write to the various localities where, in the columns of the daily press, infectious disease is reported as existent, and this is especially true of smallpox, the occurrence of which is usually reported by the various State boards of health in accordance with resolutions agreed upon by themselves in conference. The progress of an outbreak, however, is rarely reported, unless at the special request of the Bureau. These letters are all prepared in this division, and the information obtained from the replies is edited and inserted in the Public Health Reports.

The correspondence connected with this division is consequently increasing, showing a growing interest in it on the part of those interested in sanitary matters.

REPORTS OF TRANSACTIONS OF LOCAL QUARANTINES.

It has been impossible to obtain reports of quarantine transactions from the State of Louisiana and from the port of New York, although repeated efforts have been made to secure them. This fact is mentioned because in my estimation the omission of statistical information concerning the arrival and inspection and other quarantine treatment of vessels at the ports of New York and New Orleans, two of the largest in the United States, is a matter seriously affecting the completeness of the quarantine statistics.

In the absence of any law, however, compelling local quarantines to make reports to this Bureau, it is impossible to obtain such reports except through the courtesy of the State or local officers, but it is a source of gratification to be able to say that at this date local officers, with the exceptions named, do make reports to the Bureau, and all receive this publication.

MORTALITY STATISTICS—CALENDAR YEAR 1897.

In order to obtain as accurate an estimate as possible of the mortality—and morbidity where reported—throughout the United States during the calendar year 1897, I caused the same letter as in former years (see annual reports of 1896 and 1897) to be sent to all health authorities in the United States of towns having a population of 1,000 or more. Over 3,700 such letters were sent out from this office, and 1,597 replies were received which were available for use in the compilation of the statistical table.

From these replies the table of mortality statistics of 1,597 cities and towns in the United States for the twelve months ended December 31, 1897, was prepared and is here published.

This table shows the total mortality of each city and town, the mortality rate per 1,000 of estimated population, as reported during 1897, by the one to whom the letter was addressed asking for the statistics in question, and the mortality from phthisis pulmonalis, smallpox, enteric fever, typhus fever, measles, scarlet fever, diphtheria (including membranous croup), and whooping cough.

This table is the third one published by this Bureau, and in this one a radical departure has been made from former custom. Heretofore it has been the rule to calculate and insert in the table—in addition to the mortality rate per 1,000 of the estimated population—the death rate per 1,000 of the population reported according to the census of 1890. This calculation has been omitted this year, and anyone wishing to find out the rate according to that population can easily do so, using the total number of deaths and the population of the town according to the census of 1890, which is published as heretofore in one of the columns of the table. The calculation is omitted as being entirely misleading. This is especially true of the larger cities where, as in the case of New York, the population is much greater than in 1890. The estimated populations are reported by those who send in the mortality returns, and while it is not possible to regard them as absolutely correct, they are at all events far more correct than a population which might have been correct—or nearly so—nine years ago, but which in the very nature of things could not possibly be so now, except in a very few instances. As long ago as 1896 I stated in my annual report to you in this connection that “the first (Population, Census of 1890), being now six years old, is manifestly an underestimate, and as such is not capable of being used alone with any degree of accuracy in the compilation of the mortality rates, and the second, the estimated, while in the majority of cases probably an approximately correct estimate, leaves much to be desired. It must therefore be taken merely for what it is stated to be, an estimate, the liability of which to error (and error usually in excess) is manifest and natural.”

This statement is even more true to-day than it was when written, as the error of using the 1890 population as a basis for computing death rates, in a town to which in reality an eight years' increment of inhabitants has been added—the number of those dying increasing correspondingly, while the population remains theoretically stationary—is larger than it could possibly have been two years ago.

For this reason, as I have said above, it has seemed best to omit the death rate computed on the 1890 census altogether, as it would hardly be practicable to use it in some cases and not in all.

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES FOR THE TWELVE MONTHS ENDED DECEMBER 31, 1897.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Alabama:											
Avondale	25	1,642	2,500	10	4						
Birmingham	509	26,178	35,000	14.54	99	1	11	1	1	6	2
Brewton	20	1,115	2,000	10	1		1				
Decatur	37	2,765	3,000	12.33	7		1				
Evergreen	15	1,783	2,152	6.97	1						
Gadsden	31	2,901	5,000	6.20	2		1				
Greenville	33	2,806	3,000	7.66	2		1				
Mobile	916	31,076	37,817	23.92	108		20		1	1	1
Oxford	16	1,473	2,000	8			1			1	1
Ozark	11	1,195	2,200	5	3		3				
Selma	123	7,622	7,622	16.13	10		12				
Talladega	212	12,063	29,346	7.22	27		13		3	2	2
Troy	64	3,449	4,000	16	4		4			1	
Tuscaloosa	74	4,215	5,000	14.80	15		8				
Woodlawn	12	1,506	3,000	4	2						
Total	2,088		143,637	14.53	285	1	66	1	5	11	6
Arizona:											
Bisbee	22	1,535	3,000	7.30			5			3	
Tucson	133	5,150	9,000	14.70	41		1			3	
Total	155		12,000	12.92	41		6			6	
Arkansas:											
Harrison	25	1,438	1,800	13.89	1		1				
Magnolia	50	1,486	2,000	25	1		12				
Total	75		3,800	19.74	2		13				
California:											
Bakersfield	127	2,626	3,000	42.33	10		1			1	
Colton	24	1,315	2,500	9.60							
Colusa	16	1,336	2,000	8	3		1				
Dixon	25	1,082	2,000	12.50	5					2	
Eureka	91	4,858	8,000	12					1		
Marysville	99	3,991	5,000	19.80	23		3			2	
Merced	16	2,029	2,000	8	5						
Napa	30	4,395	4,000	7.50	11						1
Oakland	768	48,882	75,000	10.24	108		9	3	1	8	5
Pacific Grove	5	1,336	1,400	3.57						1	
Pasadena	132	4,882	10,000	13.20	30				5	1	
Pomona	118	3,634	7,500	15.73	26				1		
Redlands	65	1,904	4,500	14.44	33				1		1
Sacramento	444	26,386	30,000	14.80	67		3	4		9	
San Bernardino	63	4,012	9,000	15.55	19		1		1	3	
San Diego	310	16,159	22,000	14.90	34		1			1	
San Francisco	6,153	298,997	360,000	17	868		58	12	5	100	7
San Jose	288	18,060	25,000	11.50	49		4	5	6		5
Santa Ana	159	3,628	10,000	15.90	28		9	1		3	
Santa Barbara	156	5,864	6,700		26		7				
Santa Clara	34	2,891	3,100	10.96	6						
Santa Cruz	91	5,596	8,000		15		2			2	1
Santa Paula	36	1,047	2,000	18	10						1
Vallejo	100	6,343	7,500		3			2		7	
Visalia	40	2,885	4,000	10	10						
Willows	15	1,176	1,500	10							
Total	9,405		615,700	15.28	1,389		65	27	21	142	21
Colorado:											
Canyon	52	2,825	6,000	8.66			2				
Colorado Springs	282	11,140	22,000	13.70	103		10	2	3		3
Denver	1,838	106,713	160,000	11.40	461		63	22	10	45	14
Greeley	28	2,395	3,500	8	1		1			3	
Longmont	37	1,543	2,500	10.80	9		1	1		4	
Pueblo	408	24,558	40,000	10.20	7		7	2	7	7	
Rico	6	1,134	1,000	6							
Trinidad	36	5,523	6,000	6			4	2	1		
Total	2,687		241,000	11.15	574		88	29	21	59	17

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Connecticut:											
Avon.....	12	1,182	1,200	10	—	—	—	—	—	1	—
Bethel.....	38	3,401	3,600	10.50	4	—	1	—	—	1	—
Berlin.....	41	2,600	3,000	13.60	5	—	—	—	—	1	1
Bozrah.....	11	1,005	1,000	11	—	—	—	—	—	—	—
Bridgeport.....	1,004	48,866	65,000	15.40	119	—	15	—	3	33	26
Brooklyn.....	57	2,628	2,628	21.60	6	—	2	—	1	1	1
Burlington.....	24	1,302	1,300	18.40	1	—	—	—	—	—	—
Canton.....	46	2,500	2,600	17.60	4	—	—	—	—	—	—
Cheshire.....	28	1,929	1,850	15.10	3	—	—	—	—	3	—
Chester.....	16	1,301	1,300	12.30	3	—	—	—	—	—	—
Colchester.....	43	2,988	2,200	19.50	15	—	—	—	—	—	—
Colebrook.....	17	1,098	1,000	17	—	—	—	2	—	—	—
Coventry.....	33	1,875	1,775	18.50	2	—	1	—	—	—	—
Danbury.....	296	16,552	20,000	14.80	20	—	1	2	1	8	1
Darien.....	37	2,276	2,400	15.40	3	—	—	—	—	1	—
East Haddam.....	39	2,539	2,500	15.60	7	—	—	—	—	—	—
East Windsor.....	47	2,890	2,800	16.20	5	—	2	—	—	1	—
Essex.....	34	2,035	2,000	17	5	—	—	—	—	—	—
Fairfield.....	85	3,868	3,900	21.76	6	—	1	2	2	1	—
Farmington.....	56	3,179	3,500	16	3	—	—	—	—	—	—
Griswold.....	71	3,113	3,800	18.68	10	—	1	—	—	3	—
Haddam.....	34	2,095	2,000	17	1	—	1	—	—	—	—
Hartford.....	1,155	53,230	72,000	16.04	—	—	19	1	3	18	18
Hebron.....	14	1,039	1,000	14	2	—	—	—	—	—	—
Litchfield.....	42	3,304	3,500	12	4	—	—	—	—	1	—
Madison.....	27	1,429	1,400	19.21	1	—	1	1	—	—	—
Mansfield.....	38	1,911	1,900	20	—	—	—	—	—	—	—
Milford.....	51	3,811	4,000	12.75	1	—	—	—	—	2	—
New Hartford.....	44	3,160	3,890	11.31	—	—	—	—	—	—	—
New Haven.....	1,768	81,298	110,000	16.07	214	—	25	9	19	89	4
Norfolk.....	24	1,546	1,600	15	2	—	—	—	—	—	—
North Haven.....	27	1,862	2,000	13.50	1	—	1	—	—	—	—
North Stonington.....	27	1,463	1,400	19.28	2	—	—	—	—	—	—
Old Lyme.....	13	1,319	1,350	9.63	2	—	—	—	—	—	—
Old Saybrook.....	24	1,484	1,500	16	—	—	—	—	—	—	—
Orange.....	89	4,537	6,000	14.83	—	—	—	—	—	—	—
Plymouth.....	37	2,147	2,400	15.41	4	—	—	—	—	—	—
Rocky Hill.....	14	1,069	1,100	12.72	2	—	—	—	—	—	—
Seymour.....	38	3,300	3,300	11.51	4	—	1	—	—	—	—
Sharon.....	45	2,149	2,580	17.43	1	—	—	—	—	—	—
Simsbury.....	24	1,874	2,000	12	1	—	—	—	—	—	—
Sprague.....	12	1,106	1,050	11.42	1	—	—	—	—	—	—
Southbury.....	14	1,089	1,100	12.72	—	—	—	—	—	—	—
Stamford.....	347	15,700	18,500	18.75	38	—	3	—	3	19	—
Stonington.....	130	7,184	7,500	16	15	—	—	—	1	—	—
Stratford.....	57	2,608	3,500	16.28	8	—	—	—	—	—	—
Suffield.....	56	3,160	3,200	17.50	2	—	—	—	—	—	—
Tolland.....	17	1,037	1,100	15.45	—	—	—	—	—	—	—
Trumbull.....	20	1,453	1,500	13.33	—	—	—	—	—	—	—
Vernon.....	121	8,808	8,500	14.23	6	—	1	—	1	—	—
Waterbury.....	747	28,646	42,000	17.54	72	—	15	3	5	42	5
Watertown.....	37	2,323	2,800	13.21	—	—	1	—	—	—	—
Westport.....	68	3,715	4,000	17	11	—	—	1	1	1	—
Wethersfield.....	37	2,271	2,400	15.41	3	—	—	—	—	—	—
Wilton.....	36	1,722	1,700	21.17	11	—	—	—	—	—	—
Winchester.....	114	6,183	8,000	14.25	6	—	3	—	1	2	—
Woodbury.....	24	1,815	2,000	12	1	—	—	—	—	—	—
Total.....	7,407	—	463,613	15.98	635	—	94	21	41	228	56
Delaware:											
Milford.....	61	1,226	3,446	17.70	—	—	—	—	—	1	—
Wilmington.....	1,322	61,431	72,500	18.23	114	—	23	—	2	96	3
Total.....	1,383	—	75,946	18.21	114	—	23	—	2	97	3
District of Columbia:											
Washington.....	5,486	230,392	280,250	19.57	724	—	121	2	—	125	111
Total.....	5,486	—	280,250	19.57	724	—	121	2	—	125	111

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States (Census of 1890.	Estimated popula- tion.	Annual mortality per 1,000 of the esti- mated population.	Deaths from—						
					Phthisis pulmo- nalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Florida:											
Apalachicola.....	44	2,727	3,500	12.57	2			1			
Fernandina.....	81	2,803	3,500	23.14	11						
Jacksonville.....	666	17,201	30,000	20.20	53						
Key West.....	500	18,080	20,000	25.73	73		16			7	1
Ocala.....	a 60	2,904	4,000	15.9	9		3				
Pensacola.....	b 180	11,750	15,000	12.4	4		12			1	
Warrington.....	13	1,301	1,200	10.83							
Total.....	1,484		77,200	19.23	182		41	3		11	1
Georgia:											
Americus.....	140	6,398	10,000	14.4					2	1	
Carrollton.....	24	1,451	3,000	8.0	2		2				
Cartersville.....	25	3,171	3,500	7.14		1					
Columbus.....	245	17,303	19,263	12.69	38		7		1	3	
Covington.....	14	1,823	2,200	6.36	4					1	
Darien.....	16	1,491	2,000	8.0	3						
Dawson.....	33	2,284	3,000	11.1	1					1	
Decatur.....	16	1,013	2,000	8.0							
Fort Gaines.....	12	1,097	1,600	7.50							
Fort Valley.....	59	1,752	1,700	29.41	2						
Greensboro.....	8	1,313	1,750	4.57	1						
Lagrange.....	24	3,090	2,200	11.81	1		6			1	
Lithonia.....	20	1,182	1,500	13.32	4		1				
Macon.....	240	32,746	28,000	8.59		1					
Newnan.....	207	2,859	5,000	41.40	9		5			6	
Roswell.....	13	1,138	1,200	10.83	5					2	
Savannah.....	1,314	43,189	70,900	18.77	157		23	1		8	7
Sparta.....	2	1,540	1,800	1.11							
Thomaston.....	5	1,181	2,000	2.50			2				
Thomasville.....	98	5,514	6,000	16.33	9		3				
Way Cross.....	39	3,364	7,000	5.55	5		3				
Total.....	2,547		174,753	14.57	242	2	52	1	3	23	7
Idaho:											
Boise City.....	70	2,311	7,000	10.0							
Montpelier.....	6	1,174	1,200	5.0							
Total.....	76		8,200	9.27							
Illinois:											
Abingdon.....	31	1,321	2,500	12.40						1	
Altamont.....	40	1,044	1,800	22.22	3		1			2	
Astoria.....	13	1,357	2,000	6.50	3		2			2	1
Aurora.....	280	19,688	28,000	10.10	10		10	6	3	13	
Belleville.....	204	15,361	20,000	10.20	19		7		1	1	
Braceville.....	21	2,150	1,500	14.1	1				1	3	1
Bunker Hill.....	20	1,269	1,400	14.28	2		1	1			
Bushnell.....	28	3,314	3,000	9.33	4		2			3	
Cable.....	6	1,276	1,200	5.00							
Camp Point.....	12	1,150	1,300	9.15	1						
Carrollton.....	80	2,258	2,800	28.59					1		
Champaign.....	125	5,899	9,000	13.88							
Charleston.....	41	4,135	7,500	5.46			5			4	
Chenoa.....	9	1,226	1,800	5.00	4					1	
Chicago.....	21,809	1,099,850	1,619,226	13.40	2,180		437	139	81	702	160
Colchester.....	37	1,643	1,700	21.76	5					4	
Collinsville.....	50	3,498	4,000	12.50	4		2			4	
Cuba.....	10	1,114	1,500	6.66						5	
Decatur.....	30	16,841	30,000	1.4	4		3		1	2	
Dwight.....	8	1,354	2,200	3.63	1		1				
East St. Louis.....	276	15,169	35,000	7.88	26		76	3		3	1
Elgin.....	262	17,823	22,000	11.90	13				1	16	
Eureka.....	19	1,481	1,700	11.17	1					1	
Fulton.....	32	2,669	3,000	10.66							
Galva.....	50	2,409	3,000	16.66	15						
Gilman.....	19	1,112	1,500	12.66	2		2			1	
Greenfield.....	20	1,131	1,200	16.66	4		4			15	
Griggsville.....	25	1,400	2,500	10.0	2		1		1	1	

a Two deaths from typhoid fever.

b One death from yellow fever.

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1880.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Illinois—Continued.											
Harvard	38	1,967	4,500	8.44	3	—	4	—	—	2	1
Jacksonville	203	12,935	15,000	13.53	16	—	2	—	1	1	—
Kansas	40	1,037	1,200	33.33	—	—	1	—	—	—	—
Kewanee	117	4,569	8,000	14.62	14	—	1	—	—	3	—
Lena	26	1,270	1,500	17.33	8	—	—	2	—	—	—
Leroy	9	1,258	1,600	5.62	1	—	—	—	—	—	—
Maroa	9	1,164	1,500	6	2	—	—	—	—	—	—
Mason	6	1,869	425	14.11	4	—	—	—	—	—	—
Minouk	48	2,316	4,000	12	2	—	—	—	—	1	—
Monmouth	96	5,936	10,000	9.60	12	—	2	—	—	—	—
Monticello	28	1,643	2,200	12.72	12	—	3	—	1	—	—
Morgan Park	11	1,027	2,500	4.40	2	—	—	1	—	—	—
Morrison	19	2,088	2,500	7.60	1	—	1	—	—	—	—
Mount Carroll	18	1,836	2,000	9	—	—	4	—	—	1	—
Mount Pulaski	30	1,357	1,600	18.75	3	—	—	—	—	—	2
Nauvoo	21	1,208	1,300	15.38	2	—	3	—	—	1	—
North Peoria	4	1,086	2,000	2	—	—	—	—	—	—	—
Oregon	26	1,566	2,000	13	4	—	—	—	—	—	—
Peoria	725	41,024	60,000	12.08	52	—	10	—	4	16	—
Princeton	160	3,236	5,000	32	—	—	—	—	—	1	—
Quincy	545	31,494	40,000	11.12	47	—	9	—	1	15	—
Rantoul	8	1,074	1,400	5.71	—	—	—	—	—	—	—
Red Budd	15	1,176	1,400	10.71	3	—	1	—	—	—	—
Riverton	9	1,127	1,600	5.62	2	—	2	—	—	2	—
Rock Falls	45	1,900	2,500	18	5	—	3	—	—	4	3
Rockford	335	23,584	35,000	9.28	41	—	10	—	—	51	1
Rushville	27	2,031	2,500	10.80	—	—	—	—	—	—	—
Sandwich	32	2,516	2,700	11.85	5	—	—	—	—	1	—
Savanna	33	3,097	4,000	8.25	2	—	—	—	—	1	—
South Holland	9	1,005	1,100	8.18	3	—	—	—	—	—	—
Springfield	482	24,963	31,093	15.82	75	—	15	2	1	7	1
Wheaton	25	1,632	2,500	10	—	—	—	—	—	—	—
Total	26,756	—	2,066,944	12.94	2,621	—	632	155	97	892	173
Indiana:											
Angola	24	1,840	2,500	9.60	3	—	2	—	—	—	—
Argos	20	1,101	1,400	14.28	—	—	—	—	—	—	—
Aurora	29	3,929	4,000	7.25	5	—	—	—	1	2	—
Batesville	18	1,139	2,000	9	1	—	1	—	—	—	—
Bedford City	50	3,351	5,500	9.09	—	—	—	—	—	—	—
Bluffton	30	3,589	5,000	6	—	—	—	—	—	5	—
Bourbon	14	1,064	2,600	5.38	4	—	4	1	2	2	1
Bremen	14	1,076	1,600	8.75	—	—	—	—	—	—	—
Brookville	25	2,028	2,000	12.50	3	—	1	—	—	—	—
Brownstown	6	1,422	2,000	3	—	—	—	—	—	—	—
Cannelton	30	1,991	3,000	10	5	—	5	—	—	1	—
Columbia	15	3,027	3,500	4.28	4	—	4	—	—	1	—
Columbus	118	6,719	8,550	13.18	25	—	4	—	1	5	2
Connersville	94	4,548	7,000	13.42	10	—	1	—	—	—	2
Danville	10	1,569	3,000	3.33	—	—	1	—	—	—	—
Delphi	13	1,923	2,000	6.50	5	—	—	—	2	—	—
Edinburg	15	2,057	2,000	7.50	2	—	—	—	—	—	—
Elkhart	133	11,360	15,000	8.86	17	—	6	1	2	7	—
Elwood	97	2,284	12,000	8.08	11	—	2	—	1	11	1
Evansville	827	50,756	67,000	12.34	125	—	28	—	2	9	—
Fairmount	24	1,462	3,000	8	3	—	2	1	—	—	—
Fort Wayne	598	35,393	48,500	12.32	57	—	19	—	—	23	—
Fowler	3	1,285	2,000	1.50	2	—	1	—	—	—	—
Frankfort	71	5,919	10,000	7.10	14	—	1	—	—	6	2
Franklin	51	3,781	4,800	10.62	9	—	1	—	—	2	—
Garrett	40	2,767	3,000	13.33	5	—	1	—	—	3	—
Goshen	129	6,038	10,000	12.90	15	—	—	3	20	24	18
Greencastle	44	4,390	4,300	10.62	2	—	3	—	—	—	—
Hammond	154	5,425	16,000	9.62	32	—	—	1	—	24	—
Huntington	120	7,328	10,000	12	33	—	—	—	—	—	—
Indianapolis	2,112	105,436	195,000	10.83	325	—	54	6	12	34	—
Jasper	16	1,281	1,800	8.88	2	—	1	—	—	1	1
Knightstown	22	1,867	2,200	10	3	—	1	—	—	—	—
Laporte	56	7,126	8,000	7	7	—	—	—	—	6	—
Lebanon	36	3,682	6,000	6	7	—	4	1	—	3	2

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

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					Phthisis pulmonis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Indiana—Continued.											
Ligonier	13	2,195	3,000	4.33							
Madison	190	8,936	10,000	19	35		3			3	5
Marion	375	8,769	20,000	18.75	50		15	3	12	18	5
Michigan	195	10,776	15,000	13	29		5	1	4	11	5
Mount Vernon	46	4,705	5,000	9.20	6			1	1	1	1
Muncie	275	11,345	26,000	10.57	30		13	1		10	1
Newcastle	33	2,697	3,500	9.42	12		1				
New Harmony	24	1,197	1,400	17.14	3		1	1		1	
Noblesville	50	3,054	6,000	8.33	4		1		1	1	
North Manchester	8	2,384	3,000	2.66							
North Vernon	9	2,012	2,200	4.09	5						
Peru	99	7,028	9,635	10.27	3		9	1	3		
Plymouth	58	2,723	3,942	14.71	2		1			12	
Richmond	255	16,608	20,000	12.75	23		15	1		9	
Rising Sun	24	1,689	1,800	13.33	3		1				
Rochester	114	2,467	16,000	7.12	14		4				2
Salem	24	1,975	2,500	9.60	9		4		1	4	1
Shelbyville	85	5,451	7,500	11.33	13		3				
South Bend	261	21,819	30,600	8.52	32		5			10	
Spencer	15	1,868	5,000	3	3		1				
Sullivan	37	2,222	3,000	12.33	6		1				
Tell City	47	2,094	3,500	13.42	4		6	1			
Terre Haute	492	30,217	40,300	10.22	60		19	1	1	4	5
Tipton	43	2,697	4,000	10.75	8		9		1	4	1
Valparaiso	64	5,090	17,000	3.76	4		1	5	4	5	1
Vincennes	54	8,853	12,000	4.50	6		1			8	
Warsaw	26	3,574	5,000	5.20	4		1	1	1	1	1
Williamsport	30	1,027	1,200	25	2					1	
Winamac	4	1,215	1,500	2.66	1						
Winchester	23	3,014	3,300	6.96	4		3			1	1
Total	8,031		759,217	10.58	1,091		271	34	64	279	53
Iowa:											
Albia	27	2,359	3,000	9			1				
Atlantic	30	4,351	5,000	6	2		3		1	1	
Audubon	14	1,310	1,800	7.77						4	
Bellevue	16	1,394	1,600	10	1		2				
Boone	89	6,520	9,000	9.88	13		5			1	
Brooklyn	12	1,202	1,200	10						5	
Burlington	357	22,565	28,000	12.75	27		3		5	4	7
Cedar Falls	59	3,459	6,000	9.83	7						1
Cedar Rapids	207	18,020	21,600	9.58	16					6	
Clarinda	52	3,262	3,200	16.25							
Clinton	222	13,619	25,000	8.87	26		2	1		5	1
Corning	16	1,682	2,000	8	1					1	
Council Bluffs	316	21,474	35,000	9.02	25		3	6		22	
Creston		7,200	7,800		1					3	
Davenport	568	26,872	35,000	16.22	41		6			5	6
Des Moines	648	50,093	76,000	8.52	57		11	3	1	20	6
Dubuque	466	30,311	45,000	10.35	41		7			27	5
Fairfield	34	3,391	4,500	7.55	3		1			2	
Fort Madison	25	7,901	10,000	2.50	3		2		1	3	
Harlan	18	1,765	2,700	6.66							
Ida Grove	17	1,563	2,000	8.50	1						
Keokuk	245	14,101	19,300	12.64	33		6			3	2
Knoxville	30	2,632	3,000	10						2	
Lansing	23	1,668	1,800	7.82	5						
Leon	12	1,422	2,000	6	2		2			2	
Lisbon	15	1,079	1,000	15							
Lucas	6	1,320	900	6.66			1				
Malvern	8	1,003	1,200	6.66				2		1	
Marion	75	3,094	5,000	15	14					6	3
Marshall	190	8,914	10,500	18.09	19		22	1	1	13	
Monticello	18	1,938	2,100	8.57							
Mount Ayr	12	1,256	1,600	7.50			2				
Mount Vernon	13	1,259	1,200	9.23	3						
Nevada	15	1,662	2,300	6.52			2			6	2
Osage	29	1,913	2,500	11.60			4		1	8	5
Ottumwa	207	14,001	18,000	17.54	18		3		1		
Perry	40	2,880	4,000	10	3		1		1		

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					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Iowa—Continued.											
Rockford	13	1,010	1,200	10.83	—	—	—	—	—	1	2
Rock Rapids	7	1,394	2,000	3.50	1	—	1	—	—	—	—
Sac City	12	1,249	1,550	7.74	—	—	—	—	—	5	—
Sanborn	2	1,075	1,300	6.15	—	—	—	—	—	—	—
Seymour	24	1,058	2,000	12	2	—	3	—	—	—	1
Sheldon	10	1,478	2,600	3.84	—	—	2	—	—	—	—
Sibley	16	1,090	1,300	12.30	—	—	—	—	—	—	—
Sioux City	252	37,806	39,735	6.34	22	—	6	—	1	11	—
Traer	8	1,014	1,300	6.15	—	—	1	—	—	—	1
Waukon	9	1,610	1,850	4.86	6	—	3	—	—	—	—
Washington	72	3,235	4,800	15	6	—	3	1	3	11	—
Waverly	27	2,346	3,000	9	2	—	1	—	—	—	—
Whatcheer	16	3,246	3,000	5.33	1	—	1	—	—	1	1
West Union	20	1,676	2,300	8.69	—	—	—	—	—	—	1
Total	1,871	—	211,285	8.86	152	—	39	8	10	65	13
Kansas:											
Alma	4	1,125	1,500	4	—	—	1	—	1	—	—
Baxter Springs	20	1,248	4,000	5	6	—	—	—	—	1	—
Beloit	30	2,455	2,600	8.66	7	—	3	—	—	1	8
Clay Center	186	2,802	15,700	11.21	20	—	5	—	—	—	4
Clyde	19	1,137	1,250	15.20	—	—	—	—	—	5	—
Concordia	23	3,184	3,500	6.57	2	—	2	—	—	2	—
Ellis	5	1,107	1,150	4.35	1	—	—	—	—	1	—
Goodland	23	1,027	1,000	23	3	—	—	—	8	—	1
Great Bend	12	2,450	2,500	4.80	1	—	1	—	—	—	—
Herington	15	1,353	1,500	10	2	—	1	—	—	—	—
Hutchinson	91	8,682	8,500	10.70	7	—	11	—	—	5	1
Kingman	44	2,390	10,000	4.40	1	—	5	4	—	—	1
Larned	14	1,861	2,000	7	5	—	1	—	—	—	—
Leavenworth	385	19,768	22,000	17.50	33	—	4	—	4	18	3
Lyons	16	1,754	1,500	10.66	2	—	—	—	—	—	—
Medicine Lodge	8	1,095	800	10	1	—	—	—	—	—	—
Minneapolis	67	1,756	11,000	6.09	9	—	—	—	—	—	—
Neodesha	20	1,528	2,200	9.09	—	—	—	—	—	—	—
Newton	60	5,605	6,500	9.07	4	—	—	—	1	4	3
Osawatimie	25	2,662	3,000	8.33	4	—	1	—	—	—	—
Oswego	14	2,574	2,600	5.38	1	—	1	—	1	2	—
Ottawa	38	6,248	8,000	4.75	13	—	4	—	—	2	2
Parsons	100	6,736	10,000	10	6	—	1	1	2	2	—
Topeka	439	31,007	33,000	13.30	46	—	15	3	3	5	3
Washington	89	1,613	22,000	4.04	4	—	1	—	2	10	—
Total	1,747	—	177,390	9.85	178	—	56	8	22	75	26
Kentucky:											
Barboursville	10	1,162	1,500	6.66	6	—	—	—	—	1	3
Bellview	79	3,163	7,000	10	—	—	2	—	1	3	1
Cloverport	22	1,527	1,800	12.22	2	—	3	—	—	1	—
Covington	120	37,371	55,000	2.18	20	—	3	1	2	6	1
Cynthiana	62	3,016	4,000	15	11	—	2	—	—	—	—
Elizabethtown	15	2,260	2,500	6	—	—	—	—	—	—	—
Franklin	32	2,324	2,700	11.85	14	—	—	—	—	—	—
Lawrenceburg	25	1,382	1,800	14.11	10	—	5	—	—	—	2
Louisville	3,105	161,129	215,572	14.87	441	—	93	4	4	53	—
Madisonville	64	2,212	4,600	16	9	—	4	3	—	5	—
Nicholasville	17	2,157	3,000	5.66	3	—	—	—	—	—	—
Williamsburg	7	1,376	3,000	2.33	4	—	—	—	—	3	—
Total	3,549	—	301,872	11.76	520	—	114	8	7	72	7
Louisiana:											
Amite	24	1,510	2,000	12	—	—	—	—	—	1	1
Baton Rouge	214	10,478	12,000	17.50	21	—	7	1	—	—	—
Homer	11	1,132	1,500	7.33	3	—	1	—	—	1	—
Mandeville	15	1,012	900	17.44	2	—	—	—	—	—	—
Natchitoches	6	1,820	2,700	2.22	1	—	1	—	—	—	—
New Orleans	6,730	242,039	275,000	24.40	859	—	141	1	1	47	2
Total	7,000	—	294,100	23.46	886	—	150	2	1	49	3

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Maine:											
Addison	12	1,022	1,000	12	12						
Appleton	25	1,080	1,000	25	25						
Athens	9	1,072	1,000	9	9						
Auburn	145	11,250	13,000	11.15	17		2		1	5	
Bangor	332	19,103	25,000	13.28	4		2			4	
Belgrade	28	1,030	1,000	28	4						
Berwick	33	2,294	2,300	14.34	5				1		
Blue Hill	37	1,980	2,000	18.50			3				
Boothbay	14	1,718	1,718	8.15			1				
Boothbay Harbor	43	1,699	1,699	25.31	3						
Bradford	24	1,215	1,200	20							
Bristol	37	2,821	3,000	12.33			1				
Brownville	20	1,074	1,200	16.66	4		1				
Buckfield	21	1,200	1,200	17.50						2	
Buxton	36	2,036	2,000	18						1	
Calais	140	7,290	8,000	17.50	12						
Canaan	22	1,130	1,126	19.53	2						
Canton	20	1,303	1,303	15.35							
Carmel	10	1,066	1,066	9.38	12						
Chelsea	18	2,356	1,000	18							
Clinton	17	1,518	1,518	11.13	1					2	
Corinna	16	1,207	1,200	13.33			1				
Cornish	13	1,118	1,100	11.82	1					1	
Cumberland	34	1,487	1,400	24.29	1		2				
Deering	117	5,353	7,000	16.71	7		2				
Deer Isle	64	3,422	2,200	29.09	7		1		1	3	
Dexter	70	2,732	2,700	25.92	4		2				
Dover	34	1,942	2,100	16.19	7						
East Livermore	35	1,506	2,000	17.50	2		2				
Eastport	66	4,908	5,000	13.20	32		1			1	
Eliot	25	1,463	1,450	17.24	2		1				
Ellsworth	90	4,804	5,000	18	6		5				
Falmouth	19	1,580	1,600	11.87							
Farmington	60	3,207	3,207	19.05	1		1				1
Franklin	7	1,264	1,260	5.71							
Frankfort	18	1,099	1,069	16.37	5						
Fort Fairfield	34	3,526	4,500	7.55							2
Freeport	61	2,482	2,500	24.40	4		2				
Fryeburg	18	1,418	1,400	12.85	3						
Gorham	7	2,888	4,000	1.75	3			3		1	
Gouldsboro	12	1,709	1,400	8.57							
Hancock	14	1,190	1,190	11.76	1		2				
Harrington	15	1,150	1,125	13.33	1		1				
Heron	24	1,282	1,210	19.35	2						
Islesboro	11	1,006	1,006	10.93						2	
Jefferson	20	1,391	1,300	15.38							
Jonesport	26	1,917	2,000	13	6						
Limington	7	1,092	1,100	6.36							
Lincolnville	7	1,361	1,400	5	2					2	
Lisbon	51	3,120	3,500	14.57	1					4	
Litchfield	18	1,126	1,129	15.84							
Livermore	15	1,151	1,151	13.03							
Lubec	38	2,069	2,500	15.20	19						
Machiasport	13	1,437	1,437	9.04							
Millbridge	29	1,963	2,000	14.50	3						
Minot	10	1,555	800	12.50	2						
Monmouth	29	1,362	1,300	22.30	5						
Monroe	25	1,079	1,100	22.72							
Monticello	11	1,132	1,200	11	1						
New Gloucester	22	1,234	1,200	18.33	1						
Newport	24	1,188	1,500	16	7						
New Portland	16	1,034	1,000	16	3						
New Sharon	21	1,064	1,150	18.26							
Norridgewock	35	1,656	1,656	21.13	1		1				
Norway	34	2,665	3,000	11.33	4						
Oakland	30	2,044	2,000	15	3		3				
Oldtown	126	5,312	6,000	21	4					6	
Orland	31	1,390	1,400	22.13	2		2				
Palmyra	24	1,004	1,004	23.90	1					1	
Pembroke	26	1,514	1,514	17.11	1						
Penobscot	18	1,313	1,350	13.33	1			2			

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

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					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Maine—Continued.											
Phippsburg.....	32	1,396	1,400	15.71	5						
Pittston.....	4	1,281	800	5					1	3	
Portland.....	811	36,425	41,500	19.30	77		11	5	1	46	3
Presque Isle.....	41	3,046	4,000	10.25	7						
Randolph.....	16	1,281	1,281	12.58							
Readfield.....	10	1,176	1,200	8.33	1						
Saco.....	112	6,075	6,300	17.77	9		12				
St. Albans.....	24	1,206	1,206	19.90	1		1				
Sanford.....	83	4,201	6,000	13.88	6		12	1	1	2	1
Searsport.....	36	1,693	1,600	32.50	3						
Scarboro.....	26	1,794	2,000	13	1						
Sedgwick.....	20	1,012	1,000	20				1	2	3	
Sidney.....	24	1,334	1,200	20							
South Berwick.....	77	3,434	3,434	21	4						1
Stockton Springs.....	10	1,149	1,000	10	2					1	1
Thomaston.....	28	3,009	3,000	9.33	3		1			1	
Waldoboro.....	72	3,505	3,500	20.59			3			1	
Washburn.....	17	1,097	1,200	14.16							
Washington.....	23	1,230	1,231	18.68	1					1	
Waterville.....	183	7,107	8,000	23	26		5				
Westbrook.....	118	6,632	6,500	18.15	3		12	3		2	
Whitefield.....	21	1,215	1,200	17.50	2						
Wilton.....	20	1,622	1,600	12.50	5						
Windham.....	39	2,216	2,250	17.77							
Yarmouth.....	49	2,098	2,200	22.22	1			1			
Total.....	4,390		278,300	15.81	358		71	18	11	95	8
Maryland:											
Baltimore.....	9,329	434,439	506,398	18.43	1,047		189	16	53	360	42
Easton.....	9	2,939	5,000	1.80	3		3			3	
Frederick.....	159	8,193	10,000	15.90	13		1		1	2	1
Frostburg.....	80	3,804	6,000	13.33	2						
Havre de Grace.....	42	3,244	3,500	12	4		3			2	
Northeast.....	6	1,249	1,300	4.61	1		1			1	
Salisbury.....	28	2,905	1,300	21.57							
Snow Hill.....	7	1,483	1,500	4.66	3						
Total.....	9,660		534,998	18.51	1,073		197	16	54	368	43
Massachusetts:											
Acushnet.....	31	1,027	1,135	27.33	1		1	1		1	
Adams.....	179	9,213	10,000	17.90	16		4		1	4	
Agawam.....	38	2,352	2,425	15.67	6					2	
Amesbury.....	176	9,798	10,000	17.60			2				1
Amherst.....	88	4,512	5,000	17.60	2						
Arlington.....	141	5,629	7,000	20.13	17		1	1		2	
Ashburnham.....	24	2,074	2,000	12							
Ashfield.....	13	1,025	1,025	12.69	1						
Ashland.....	26	2,532	2,090	12.44	3						
Auburn.....	26	1,532	1,600	16.25	1						
Avon.....	30	1,384	1,640	18.29						1	1
Ayer.....	41	2,148	2,100	19.52	4		2				
Barnstable.....	63	4,023	4,055	15.54	7				1	1	1
Barre.....	46	2,239	2,278	20.19	3				1	1	
Belchertown.....	44	2,120	2,161	20.32	5						
Belmont.....	50	2,098	3,500	14.28						1	
Beverly.....	168	10,821	13,000	12.92	14		4	1			
Billerica.....	42	2,380	2,630	15.97	4		4		1	11	
Boston.....	11,154	448,477	528,912	21.00	1,289		173	21	136	456	39
Braintree.....	110	4,488	5,300	20.75	7		1	1	2	3	
Brewster.....	18	1,003	901	19.79	1					1	
Bridgewater.....	51	4,249	4,700	10.85	5						
Brimfield.....	21	1,096	962	21.03							
Brockton.....	473	27,294	35,853	13.19	60		4	2	4	22	3
Brookfield.....	58	3,352	3,200	18.13	7						
Brookline.....	203	12,103	17,500	11.60	21		2			6	
Buckland.....	24	1,570	1,900	12.63	3						
Cambridge.....	1,531	70,028	86,812	17.63	197	2	11	3	10	51	17
Chatham.....	43	1,954	1,805	23.83	3		1		2		
Chelsea.....	593	27,909	33,000	17.97	87		6	1	1	13	

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

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					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.	
Massachusetts—Cont'd.												
Chester	24	1,295	1,400	17.14	1					1		
Chelmsford	63	2,695	3,200	20	3					4		
Chicopee	361	14,050	18,500	19.51	33		5	1		21		3
Clinton	161	10,424	13,000	12.38	24				1	1		
Concord	49	4,427	5,525	8.68	3		1		1	1		
Conway	16	1,451	1,400	11.42								
Cottage City	15	1,080	1,050	14.29	1			1				
Dalton	52	2,885	3,210	16.20			2		1	1		
Danvers	112	7,454	7,500	14.94	10		1		1	3		
Dartmouth	74	3,122	3,100	23.87	1				1			
Dedham	122	7,123	6,500	18.77	18					4		
Deerfield	42	2,610	3,000	14	5	1	1					
Dennis	50	2,899	2,545	19.84	4		1					
Dighton	31	1,889	1,800	17.33	5							
Douglass	57	1,908	2,000	28.50	9					2		
Dracut	46	1,996	2,500	18.40								
Dudley	58	2,944	3,203	18.11	1					4		
Easthampton	60	4,395	5,000	12	6					1		
Edgartown	18	1,156	1,200	15			1					
Essex	32	1,713	1,587	20.16				1		2		
Everett	363	11,068	22,000	16.50	35		4	2	5	25		8
Fall River	2,135	74,398	101,103	21.12	168		32	9	32	29		11
Falmouth	55	2,567	2,655	20.72	12					1		
Fitchburg	414	22,637	28,392	14.58	35		5	1		13		1
Foxboro	67	2,933	3,500	19.14						1		
Framingham	158	9,239	10,000	15.80	14		2	1		12		1
Franklin	66	4,831	5,700	11.56	1		1					
Freetown	27	1,417	1,400	19.29	1							
Gardner	142	8,424	10,000	14.20	16		2		1	6		
Grafton	84	5,002	5,000	16.80	4		1			1		
Granville	32	1,061	1,004	51.87								
Great Barrington	66	4,612	5,000	13.20								
Greenfield	115	5,252	7,500	15.35	7				2	2		
Groton	37	2,057	2,200	16.82	5		1		2			
Groveland	38	2,191	2,333	16.25			3					
Hadley	32	1,689	1,704	18.78	3			1				
Hanson	20	1,267	1,300	15.38	1		1					
Hardwick	36	2,922	3,000	12	1					2		
Harvard	24	1,095	1,200	20								
Harwich	48	2,734	2,534	18.94								
Hatfield	22	1,246	1,300	16.92								
Haverhill	517	27,412	26,631	14.11	79		16	1	5	20		1
Hingham	78	4,564	4,564	17.09	7				1	7		
Hinsdale	23	1,739	1,500	15.33	2				1			
Holden	35	2,623	2,602	13.41								
Holliston	43	2,619	2,700	15.92	5							
Holyoke	827	35,637	44,214	18.70	47		3	6	2	2		2
Hopedale	9	1,176	1,451	6.20			1					
Hopkinton	42	4,088	4,000	10.50								
Hydepark	204	10,193	13,000	15.69	22		2	1	1	7		1
Ipswich	81	4,439	4,720	17.16			1			6		
Kingston	33	1,659	1,650	20	3							
Lancaster	39	2,201	2,180	17.89	2							
Lanesboro	23	1,018	848	27.12			1					
Lawrence	1,087	44,654	55,510	19.58	20		9		11	31		1
Lee	58	3,785	4,065	14.26	5							
Leicester	51	3,120	3,200	15.62	6		2					
Leominster	145	7,269	10,000	14.50	18		2					
Lexington	53	3,197	3,498	15.15			1					
Ludlow	47	1,939	2,562	18.34						1		
Lunenburg	17	1,146	1,300	13.07	2		2					
Malden	463	28,031	32,500	14.24	53		4	1	1	16		
Manchester	24	1,789	1,900	12.63	6							
Maynard	49	2,700	3,090	15.85	2					1		
Medfield	24	1,493	1,900	12.63	2							1
Medford	216	11,079	15,832	13.63	13		1	2				1
Melrose	180	8,519	12,520	14.37	19		2	3		4		2
Merrimac	30	2,653	2,300	13.04	2				2			
Methuen	93	4,814	6,500	14.31	11		3			3		
Middleboro	88	6,065	6,689	13.30	4		1			1		
Milford	174	8,780	8,959	19.42	25		3		1	1		

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

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Massachusetts—Cont'd											
Milton	84	4,278	5,700	14.74	15			1	1	1	
Monson	60	3,650	3,900	15.39	7		1				
Nantucket	72	3,238	3,000	24	4						
Needham	54	3,035	3,500	15.43	4		2				
New Bedford	1,275	40,733	56,000	22.77	91		23	5	13	47	1
Newbury	16	1,427	1,500	10.65	1						
Newburyport	232	13,947	14,552	15.94	17		5			9	
Newton	447	24,379	28,000	15.96	43		5		5	12	
North Adams	393	16,074	17,000	15.15	26		3		1	18	
Northampton	322	14,990	17,000	18.94	33		3		1	21	
North Andover	61	3,742	3,569	17.09	3		1			1	
North Attleboro	78	6,727	6,720	11.61	9		2			1	
Northfield	31	1,869	1,850	16.76	2		2			2	
Norwell	27	1,635	1,634	16.52	1						
Orange	75	4,568	5,000	15	10		1				
Orleans	24	1,219	1,200	20							
Oxford	56	2,616	2,400	23.33	5		2				
Peabody	207	10,158	11,000	18.82	25	1	4	1		18	1
Palmer	114	6,520	6,858	16.62	13		1			4	
Petersham	24	1,050	912	26.33	6		2				
Pittsfield	294	17,281	22,000	13.35	25		3			7	
Plymouth	152	7,314	8,000	16.25	15				1	3	3
Provincetown	79	4,642	4,650	16.99	4		1				1
Quincy	354	16,723	22,562	15.69	41		6	3	2	3	
Reading	62	4,088	5,000	12.40	6		1			3	
Rehoboth	35	1,786	1,800	19.44	4		2				
Rochester	15	1,012	1,012	14.82	2		2				
Rockland	84	5,213	5,650	14.81	8						2
Rockport	77	4,087	4,500	17.10	11				2	2	
Rowley	17	1,248	1,275	13.33	2		1			1	
Royalston	25	1,030	890	25.85							
Salem	594	30,801	36,000	16.50	47		6		4	15	
Sandwich	24	1,819	1,600	15	1						
Scituate	53	2,318	2,300	23.04	8		3			2	
Sharon	34	1,634	1,717	18.97						1	
Sheffield	30	1,954	1,887	15.95			1				
Sherborn	29	1,381	1,446	20.06							
Shirley	29	1,191	1,400	20.71	1						
Somerset	41	2,166	2,000	20.50	1		1			1	
Somerville	859	40,152	58,000	14.81	67	1	11	3	6	44	4
Southampton	14	1,017	1,054	13.28	2						
Southboro	42	2,114	2,100	20	12					1	
Southbridge	159	7,655	8,000	17.37	15		2			6	
South Hadley	68	4,261	4,443	15.30	5					2	
Stockbridge	30	2,132	2,077	14.43	2						
Stoneham	96	6,155	6,300	15.24	16		1				
Stoughton	89	4,852	5,272	16.88	11					4	
Sturbridge	41	2,074	2,000	20.50	2		1			5	2
Sudbury	23	1,197	1,150	20	1						
Sutton	64	3,180	3,480	18.39	5					2	
Swampscott	54	3,198	3,500	15.43						1	
Swansea	18	1,456	1,650	10.91	3					1	
Taunton	588	25,448	27,812	21.14	59		6	2	4	10	1
Templeton	54	2,999	3,000	18					1		
Tisbury	15	1,506	1,000	15							
Topsfield	27	1,022	1,027	26.29							
Townsend	42	1,750	1,700	24.70	2						
Upton	37	1,878	2,150	17.21	5		1		2	1	
Uxbridge	72	3,408	3,550	20.28	3					1	
Walpole	47	2,004	3,000	15.66	3					2	
Waltham	288	18,707	21,500	13.39	31		2		2	6	
Ware	132	7,329	7,651	17.20	9			2		3	
Warren	62	4,681	4,000	15.50	10					1	
Watertown	103	7,073	8,060	12.78	12		1	2	8	5	
Wayland	29	2,060	2,500	11.60						1	
Wellesley	47	3,600	5,000	9.40	3					1	
Wellfleet	20	1,291	960	20.83							
West Boylston	44	3,019	3,000	14.66						1	
West Bridgewater	20	1,917	1,747	11.45	2						
Westfield	154	9,805	10,663	14.44	19		4			2	
Westford	41	2,250	2,418	16.96				1			

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Pneumonia.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Massachusetts—Cont'd.											
Westminster	26	1,688	1,300	20	4						
West Newbury	23	1,796	1,700	13.53	6		2				
Weston	20	1,664	1,710	11.69	2						
Westport	37	2,599	2,678	13.83	2		1	3			
West Stockbridge	23	1,492	1,257	17.50							
Weymouth	195	10,896	11,400	17.10	19		3	1	4	4	1
Whitman	78	4,441	6,000	13	13						
Williamsburg	42	2,057	2,000	21	11			1			1
Wilmington	25	1,213	1,400	17.86	3		1			1	
Winchester	76	4,861	6,500	11.69	11		1		3	5	
Woburn	251	13,499	14,178	17.70	35		3	3		5	2
Worcester	1,791	84,655	106,202	16.86	228		15	17	8	59	1
Yarmouth	39	1,790	1,650	23.64	2						
Total	37,296		2,072,638	17.99	3,478	5	483	108	928	1,165	123
Michigan:											
Albion	60	3,763	5,000	12	3		1				
Allegan	29	2,669	2,800	10.36				1		1	
Ann Arbor	115	9,431	14,000	8.21	8		1				
Battlecreek	81	13,197	18,000	4.50							
Bay City	317	27,839	33,000	9.60	25		12			2	
Benton Harbor	66	3,692	7,000	9.43	2					3	
Bessemer	46	2,566	3,500	13.14	4					11	1
Big Rapids	57	5,303	6,000	9.50	7		1				
Blissfield	20	1,132	2,100	9.52	2		1			1	
Buchanan	34	1,994	2,000	17	1					2	
Cadillac	44	4,461	5,500	8	3						
Caro	15	1,701	2,000	7.50	5		1	1		2	
Carrollton	7	1,074	750	9.33	1						
Cassopolis	9	1,369	1,450	6.21	2						1
Charlevoix	30	1,496	2,500	12	3		2				
Cheboygan	108	6,235	7,000	15.42	8			1		2	2
Chelsea	22	1,356	1,500	14.66	2			1			
Chesaning	14	1,056	1,300	10.70							
Clare	7	1,174	1,500	4.66							
Coldwater	82	5,247	5,286	15.51	7		1	1		2	
Constantine	27	1,346	2,500	10.80	4						
Decatur	15	1,109	1,300	11.53							
Detroit	4,848	205,876	275,000	17.63	249		38	16	53	225	7
Dowagiac	27	2,806	4,000	6.75	4						
Eastlake	26	1,856	3,000	8.06	9		1				
Escanaba	55	6,808	8,000	6.88	6		3			2	
Flint	117	9,803	10,429	11.23	12		1	1		1	1
Gladstone	10	1,337	3,000	3.33	2						
Harbor Springs	12	1,052	1,200	10	2		2	1			
Hillsdale	56	3,915	4,400	12.73	2			1			
Holland	60	3,945	8,000	7.50	6		4			1	
Holly	2	1,276	1,800	1.11	1		1				
Homer	9	1,063	1,200	7.50	1						
Howard	10	1,137	1,650	6.07							
Imlay	8	1,251	1,300	6.15							
Ionia	50	4,482	5,000	10					1		
Iron Mountain	110	8,599	8,000	13.75	7		1			1	
Iron River	5	1,117	800	6.25					1		
Ironwood	90	7,745	9,000	10	10		1		1	5	2
Ishpeming	141	11,197	12,000	11.75	14		4	1		11	4
Ithaca	16	1,627	2,400	6.66	3		1				
Jonesville	22	1,288	1,500	14.67	3						
Kalamazoo	248	17,853	22,000	11.27	30		7			6	2
Lake Linden	34	1,862	2,400	14.17							
Lakeview	7	1,024	1,200	5.83	1						
Lapeer	23	2,753	3,500	6.57	2		2		1	2	
Mancelona	13	1,205	1,400	9.29	1						
Manistee	250	12,812	15,000	16.66	25		3			1	2
Manistique	30	2,940	3,000	10	4						
Marine	38	3,268	3,560	10.83	2		1			1	
Mason	25	1,875	1,800	13.89	3						
Mount Clemens	108	4,748	6,000	18	4		1		3	1	
Mount Pleasant	24	2,701	3,500	6.85	2					1	
Muskegon	437	22,702	23,000	19						1	

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

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					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Michigan—Continued.											
North Muskegon.....	1	1,596	350	2.86	.....	.....	1	.....	.....	.....	.....
Oscoda.....	10	3,593	1,500	6.66	2	.....	.....	.....	.....	.....	.....
Otsego.....	21	1,626	1,700	12.41	1	.....	.....	.....	.....	1	.....
Owosso.....	122	6,564	11,000	11.09	.....	.....	.....	.....	.....	9	.....
Paw Paw.....	28	1,391	2,400	11.66	4	.....	.....	.....	.....	.....	.....
Pentwater.....	18	1,510	1,400	12.86	.....	.....	1	.....	.....	8	.....
Petosky.....	35	2,872	4,500	7.77	2	.....	2	.....	2	.....	.....
Pontiac.....	125	6,200	7,500	16.66	3	.....	.....	.....	.....	.....	.....
Port Huron.....	249	13,543	20,000	12.45	8	.....	1	.....	4	7	1
Richmond.....	16	1,074	1,300	12.31	2	.....	1	.....	.....	.....	.....
St. Ignace.....	25	2,704	2,500	10	4	.....	.....	.....	.....	.....	.....
St. Louis.....	33	2,246	2,200	15	6	.....	2	.....	.....	.....	.....
Sand Beach.....	8	1,046	1,250	6.40	.....	.....	.....	.....	.....	.....	.....
Sault Ste Marie.....	116	5,760	10,000	11.60	3	.....	1	.....	.....	.....	.....
South Haven.....	12	1,924	4,000	3	.....	.....	1	.....	.....	.....	1
Stanton.....	18	1,352	1,303	13.83	1	.....	.....	.....	.....	.....	1
Sturgis.....	20	2,489	3,300	6.06	.....	.....	.....	.....	.....	.....	.....
Tawas.....	15	1,544	1,200	12.50	4	.....	.....	.....	.....	.....	.....
Three Rivers.....	28	3,131	4,000	7	2	.....	.....	2	.....	1	.....
Traverse.....	49	4,353	8,500	5.82	7	.....	1	.....	.....	4	1
Union.....	14	1,156	1,585	8.83	1	.....	.....	.....	.....	3	.....
Vassar.....	25	1,682	2,000	12.50	1	.....	1	.....	.....	.....	.....
Wyandotte.....	40	1,817	4,500	8.88	1	.....	4	.....	.....	13	.....
Total.....	8,944	.....	671,944	13.31	540	.....	109	28	66	330	26
Minnesota:											
Albert Lea.....	48	3,306	5,000	9.60	5	.....	1	.....	.....	1	.....
Alexandria.....	14	2,118	2,600	5.39	1	.....	.....	.....	.....	.....	.....
Blue Earth.....	29	1,599	3,000	9.66	4	.....	.....	.....	.....	.....	.....
Cannon Falls.....	16	1,078	1,500	10.66	.....	.....	1	.....	.....	.....	.....
Cloquet.....	9	2,530	3,000	3	1	.....	.....	.....	.....	.....	.....
Crystal.....	3	1,074	1,000	3	.....	.....	.....	.....	.....	.....	.....
Detroit.....	17	1,510	2,000	8.50	3	.....	.....	.....	.....	.....	.....
Fairmont.....	21	1,205	2,300	9.13	6	.....	1	.....	.....	.....	.....
Faribault.....	114	6,520	10,000	11.40	4	.....	4	.....	.....	17	.....
Hastings.....	24	3,705	4,000	6	.....	.....	.....	.....	.....	.....	.....
Jordan.....	19	1,233	1,500	12.66	.....	.....	.....	.....	.....	1	.....
Lake City.....	27	2,128	3,000	9	6	.....	.....	.....	.....	.....	.....
Lesneur.....	17	1,763	2,200	7.73	4	.....	.....	.....	.....	.....	.....
Littlefalls.....	59	2,354	5,500	10.73	6	.....	3	.....	.....	1	.....
Mankato.....	84	8,838	12,000	7	12	.....	2	.....	.....	1	.....
Minneapolis.....	1,971	164,738	225,602	8.74	234	.....	148	.....	7	28	14
Montgomery.....	6	1,086	1,100	5.45	1	.....	.....	.....	.....	.....	.....
Montevideo.....	18	1,437	2,000	9	2	.....	2	.....	.....	.....	.....
Morris.....	13	1,266	1,800	7.22	1	.....	.....	.....	.....	1	.....
North St. Paul.....	10	1,069	1,000	10	1	.....	.....	.....	.....	1	.....
Owatonna.....	33	3,849	6,500	5.07	2	.....	.....	.....	.....	2	.....
Red Wing.....	84	6,294	8,000	10.50	14	.....	.....	.....	.....	2	.....
St. Charles.....	18	1,178	1,500	12	1	.....	.....	.....	.....	.....	.....
St. Paul.....	1,387	133,156	215,582	6.43	203	.....	22	13	11	46	5
St. Paul Park.....	10	1,173	800	12.50	4	.....	.....	.....	.....	.....	.....
St. Peter.....	25	3,671	3,500	7.14	4	.....	.....	.....	.....	.....	.....
Sauk Center.....	17	1,695	2,500	6.80	6	.....	.....	.....	.....	.....	.....
Sauk Rapids.....	7	1,185	1,400	5	.....	.....	.....	.....	.....	.....	.....
Shakopee.....	14	1,757	2,000	7	2	.....	1	.....	.....	.....	.....
Sleepyeye.....	13	1,513	2,000	6.50	3	.....	.....	.....	.....	.....	.....
South St. Paul.....	13	2,242	2,100	6.19	2	.....	.....	.....	.....	3	.....
South Stillwater.....	12	1,304	1,240	9.68	3	.....	1	.....	.....	.....	.....
Spring Valley.....	36	1,381	2,060	17.33	4	.....	.....	.....	.....	1	1
Tracy.....	3	1,400	2,000	1.50	1	.....	.....	.....	.....	.....	.....
Wabasha.....	30	2,487	3,000	10	2	.....	.....	.....	.....	1	.....
Willmar.....	23	1,825	3,000	8.66	3	.....	.....	.....	.....	.....	.....
Winona.....	250	18,208	22,000	11.36	32	.....	.....	4	.....	1	2
Worthington.....	15	1,164	2,000	7.50	.....	.....	1	.....	.....	.....	.....
Total.....	4,514	.....	572,284	8.02	563	.....	187	17	18	107	22

a St. Peter State Hospital for Insane, 82.

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Mississippi:											
Bay St. Louis.....	75	1,974	2,500	30	7	.....	7	.....	.....	.....	.....
Biloxi.....	120	3,234	5,000	24	.....	.....	.....	.....	.....	.....	.....
Gloster.....	2	1,142	1,300	1.54	.....	.....	.....	.....	.....	1	.....
Grenada.....	40	2,416	3,000	13.33	1	.....	.....	.....	.....	.....	.....
Greenwood.....	20	1,055	2,000	10	3	.....	3	.....	.....	1	.....
Hattiesburg.....	10	1,172	3,000	3.33	.....	.....	.....	.....	.....	.....	.....
Iuka.....	14	1,019	1,000	14	2	.....	.....	.....	.....	.....	.....
Lexington.....	4	1,075	1,200	3.33	1	.....	.....	.....	.....	.....	.....
Ocean Springs ^a	14	1,148	1,500	.....	2	.....	.....	.....	.....	.....	.....
Okolona.....	22	2,099	2,200	10	.....	.....	.....	.....	.....	1	.....
Oxford.....	24	1,546	2,500	9.60	5	.....	.....	.....	.....	2	.....
Summit.....	10	1,587	2,500	4	2	.....	2	.....	.....	1	1
Tupelo.....	12	1,477	1,800	6.66	1	.....	.....	.....	.....	.....	.....
Total.....	367	.....	29,500	12.44	.....	.....	.....	.....	.....	.....	.....
Missouri:											
Albany.....	.....	1,334	2,500	.....	.....	.....	.....	.....	.....	.....	.....
Appleton.....	15	1,081	1,800	8.33	6	.....	2	.....	.....	1	.....
Aurora.....	.....	3,482	5,000	.....	.....	.....	.....	.....	.....	.....	.....
Cape Girardeau.....	73	4,297	5,000	14.60	11	.....	3	2	.....	2	.....
Charleston.....	.....	1,381	2,000	.....	2	.....	1	2	.....	.....	.....
Clarksville.....	25	1,186	1,500	16.66	.....	.....	.....	.....	.....	.....	3
Clinton.....	64	4,737	7,000	9.14	7	.....	3	.....	.....	4	.....
Crystal.....	9	1,104	1,500	6	1	.....	.....	.....	.....	.....	.....
Eldorado Springs.....	50	1,543	3,000	16.66	3	.....	15	.....	.....	.....	.....
Grant.....	10	1,186	1,800	5.55	.....	.....	1	.....	.....	2	.....
Hannibal ^b	154	12,857	15,000	10.27	6	.....	9	.....	.....	5	.....
Kirkwood.....	21	1,777	2,500	8.40	3	.....	.....	.....	.....	.....	.....
Lebanon.....	45	2,218	3,000	15	7	.....	.....	1	.....	5	.....
Milan.....	19	1,234	2,000	9.50	3	.....	1	.....	.....	.....	.....
Monroe.....	18	1,830	2,500	7.20	4	.....	.....	.....	.....	.....	1
Mound.....	60	1,193	1,860	32.26	1	.....	5	.....	.....	12	10
Palmyra.....	30	2,515	3,000	10	4	.....	2	.....	.....	5	.....
Poplarbluff.....	90	2,187	6,000	15	22	.....	4	2	.....	3	.....
St. Joseph.....	682	52,324	55,000	12.40	66	.....	22	6	4	21	15
St. Louis.....	9,550	451,770	600,000	15.91	997	3	125	1	19	250	57
Seneca.....	10	1,101	1,200	8.33	.....	.....	.....	.....	.....	2	.....
Springfield.....	455	21,850	3,500	130	114	.....	.....	.....	.....	3	.....
Stanberry ^c	75	2,035	5,000	15	16	.....	4	.....	1	10	.....
Unionville.....	6	1,118	1,800	3.33	1	.....	.....	.....	.....	3	.....
Washington.....	30	2,725	3,000	10	2	.....	2	.....	.....	.....	.....
Wellsville.....	30	1,138	2,500	12	1	.....	2	.....	.....	2	.....
Willowsprings.....	15	1,535	1,800	8.33	1	.....	.....	.....	.....	3	.....
Total.....	11,536	.....	740,760	15.57	1,278	3	201	14	24	333	86
Montana:											
Bozeman.....	34	2,143	4,000	8.50	3	.....	2	.....	.....	.....	.....
Butte.....	471	10,723	47,000	10	30	.....	18	1	.....	17	2
Dillon.....	18	1,012	1,800	10	.....	.....	3	.....	.....	6	.....
Greatfalls.....	105	3,979	12,000	8.75	5	.....	7	1	.....	2	5
Marysville.....	12	1,489	1,500	8	1	.....	2	.....	.....	.....	.....
Total.....	640	.....	66,300	9.65	39	.....	32	2	.....	26	7
Nebraska:											
Beatrice.....	102	13,836	12,000	8.50	.....	.....	4	1	.....	11	1
Blair.....	23	2,069	3,000	7.66	3	.....	1	1	.....	4	.....
Central.....	23	1,368	1,800	12.66	1	.....	.....	.....	.....	3	.....
Crete.....	30	2,310	3,000	10	5	.....	.....	.....	.....	2	.....
Fairmont.....	10	1,029	800	12.50	.....	.....	.....	.....	.....	.....	.....
Grand Island.....	60	7,536	8,000	7.50	3	.....	5	.....	.....	.....	2
Lincoln.....	283	55,154	50,000	5.66	1	.....	14	6	.....	3	2
Norfolk.....	42	3,038	5,000	8.40	4	.....	1	1	.....	1	.....
North Platte.....	34	3,055	3,500	9.71	4	.....	1	.....	.....	.....	.....
Omaha.....	960	140,452	140,000	6.86	108	.....	.....	.....	9	39	.....
Pawnee.....	17	1,550	2,000	8.50	1	.....	5	.....	.....	.....	.....

^aTwelve deaths from yellow fever.^cSeven deaths from typhus.^bTwo deaths from typhus.

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

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					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Nebraska—Continued.											
South Omaha.....	204	8,062	15,000	13.69	—	—	—	—	—	—	—
Sutton.....	12	1,541	1,850	6.49	2	—	1	—	—	—	4
Tecumseh.....	10	1,654	2,750	3.63	1	—	1	—	—	1	—
Tekamah.....	6	1,244	1,600	3.75	1	—	—	—	—	—	—
Total.....	1,816	—	250,600	7.25	134	—	33	9	9	64	9
Nevada:											
Reno.....	63	3,563	5,000	12.60	10	—	—	—	1	3	—
Tuscarora.....	10	1,156	850	11.76	—	—	—	—	1	—	—
Virginia City.....	79	8,511	5,000	15.80	13	—	2	—	1	6	—
Total.....	152	—	10,850	14.01	23	—	2	—	3	9	—
New Hampshire:											
Alton.....	21	1,372	1,375	15.35	—	—	—	—	2	—	—
Amherst.....	13	1,053	1,000	13	1	—	—	—	—	—	—
Barnstead.....	19	1,264	1,250	15.20	—	—	—	—	—	—	—
Barrington.....	26	1,408	1,400	18.57	3	—	1	—	—	1	—
Bedford.....	26	1,102	1,100	23.63	—	—	1	—	—	1	—
Belmont.....	23	1,142	1,100	20.99	4	—	—	—	—	—	—
Bethlehem.....	32	1,267	1,250	25.62	4	—	—	—	—	—	—
Bristol.....	27	1,524	1,500	11.33	2	—	—	—	—	—	—
Canaan.....	28	1,417	1,472	19.02	2	—	1	—	—	—	—
Candia.....	21	1,108	1,108	18.95	2	—	2	—	—	—	—
Charlestown.....	28	1,466	1,560	17.95	3	—	2	—	—	1	—
Chesterfield.....	12	1,046	1,200	10	—	—	—	—	—	—	—
Claremont.....	106	5,565	6,500	16.31	—	—	—	—	—	8	—
Concord.....	349	17,004	18,000	19.39	5	—	2	—	1	1	—
Epping.....	37	1,721	1,700	21.76	4	—	1	—	—	1	—
Farmington.....	63	3,064	3,064	20.56	14	—	1	—	—	—	—
Franklin.....	66	4,085	4,500	14.67	2	—	—	—	—	—	—
Goffstown.....	32	1,981	2,000	16	8	—	—	—	—	1	—
Hanover.....	31	1,817	1,800	17.17	1	—	—	—	—	—	—
Haverhill.....	62	2,545	2,545	24.36	10	—	—	—	—	3	—
Henniker.....	16	1,385	1,300	12.31	1	—	—	—	—	1	—
Hillsboro.....	48	2,120	2,400	20	—	—	—	—	—	—	—
Hinsdale.....	30	2,258	2,000	15	2	—	—	—	—	—	—
Hopkinton.....	27	1,817	1,800	15	1	—	2	—	—	—	—
Hudson.....	22	1,062	1,100	20	3	—	—	—	—	—	—
Keene.....	139	7,446	8,000	17.38	11	—	1	—	—	1	—
Lisbon.....	44	2,060	2,200	20	3	—	1	—	—	1	—
Londonderry.....	32	1,220	1,200	26.66	1	—	1	—	—	—	—
Manchester.....	1,018	44,126	60,000	16.97	88	—	12	3	1	37	13
Marlboro.....	22	1,695	1,600	13.75	1	—	—	—	—	—	—
Milan.....	17	1,029	1,200	14.17	—	—	—	—	—	—	—
Milford.....	58	3,014	4,000	14.50	4	—	1	1	—	—	—
Milton.....	26	1,640	2,000	13	3	—	—	—	—	—	—
Moultonboro.....	18	1,034	1,000	18	2	—	—	—	—	—	—
Newmarket.....	57	2,742	3,000	19	9	—	—	—	—	1	—
Northernland.....	27	1,356	2,000	13.50	2	—	1	—	—	—	—
Ossipee.....	32	1,630	1,700	18.82	4	—	—	—	2	1	—
Peterboro.....	48	2,567	2,500	19.20	3	—	—	—	—	2	—
Pittsfield.....	31	2,605	2,300	13.48	3	—	—	—	—	—	—
Plaistow.....	13	1,085	1,200	10.83	—	—	—	—	—	—	—
Raymond.....	16	1,131	1,130	14.16	2	—	—	—	1	—	—
Salem.....	31	1,805	1,900	16.32	2	—	—	—	—	—	—
Sanbornton.....	16	1,027	1,000	16	2	—	—	—	—	2	—
Somersworth.....	159	6,207	6,500	24.46	5	—	5	—	—	6	—
Swansey.....	19	1,600	1,600	11.88	3	—	—	—	—	—	—
Tilton.....	33	1,521	1,900	17.37	1	—	—	—	—	—	—
Wakefield.....	30	1,523	1,700	17.65	—	—	—	—	—	—	—
Walpole.....	60	2,163	2,100	28.57	4	—	—	1	—	—	—
Warner.....	28	1,383	1,400	20	4	—	—	—	—	4	—
Weare.....	25	1,550	1,500	16.67	2	—	—	—	—	—	—
Winchester.....	42	2,584	2,800	15	7	—	1	—	—	—	—
Wolfsboro.....	43	3,020	3,030	14.19	—	—	1	—	1	1	—
Total.....	3,249	—	184,182	17.64	234	—	34	5	8	74	13

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					Phthisis pulmo- nalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
New Jersey:											
Atlantic City	241	13,055	24,500	9.84	11		4		1	5	
Boundbrook	20	1,462	2,500	8						5	
Carlstadt	33	1,549	3,000	11							
Clayton	23	1,807	2,000	11.50	3						
Dunellen	11	1,060	1,300	8.46	4					3	
Egg Harbor	27	1,439	1,537	17.57	1						1
Fort Lee	63	1,253	1,253	50.27	1		1			1	
Frenchtown	13	1,023	1,052	12.34	2						1
Hackettstown	30	2,417	2,500	12	1						
Haddonfield	49	2,502	2,600	18.85	6		3		1	7	1
Hammonton	96	3,833	3,850	24.94				1		3	2
Hoboken	1,078	43,648	57,000	18.91	129		8		13	30	5
Jersey City	3,634	163,063	191,481	18.98	438		41	8	59	185	13
Lambertville	102	4,142	4,620	22.08	4		12			1	
New Brunswick	282	18,603	20,432	13.80	45		7		1	12	5
Ocean Grove	45	2,754	2,000	22.50	3						
Orange	380	18,844	24,000	15.83					4	20	
Oxford	24	2,383	2,500	9.50	2						
Raritan	45	2,665	2,604	16.74	2					1	
Riverton	9	1,075	1,250	7.20			1				
Salem	127	5,516	6,337	20.04							
South Amboy	108	4,330	7,000	15.43	2					8	3
South Orange	27	3,106	4,500	6	3						
Tenafly	12	1,046	1,800	6.67	2						
Toms River	24	1,147	2,800	8.57							
Union	28	10,643	3,500	8							
Woodbury	64	3,911	4,000	16	6					1	
Total	6,595		382,006	17.26	669		83	9	59	284	32
New Mexico:											
Deming	8	1,136	1,600	5	1	1					
Las Vegas	35	2,385	3,000	11.66	24		2	1	1		
Total	43		4,600	9.35	25	1	2	1	1		
New York:											
Adams	21	1,360	1,279	16.42							
Addison	39	2,166	2,600	15	4		3				
Albany	2,016	94,923	98,000	20.37	259		84		2	69	
Albion	103	4,586	7,000	14.71	10		3			3	
Alexandria Bay	14	1,123	1,300	10.77	4						
Amityville	18	2,293	1,700	10.59	2						
Attica	39	1,994	2,800	13.93							
Avon	35	1,653	2,000	17.50	6						
Baldwinsville	42	3,040	3,040	13.81	6						
Ballston Spa	62	3,527	4,153	14.93	3		1			2	1
Bainbridge	36	1,049	2,400	15							
Bath on Hudson	48	2,399	2,448	19.61	11		1			4	
Binghamton	590	35,005	44,000	13.41	62		13	14	1	14	7
Boonville	55	1,613	4,000	13.75	10						
Brookport	74	3,742	3,725	19.87	7				2		
Brooklyn	20,674	806,343	1,160,000	17.82	2,164	3	173	190	187	998	164
Buffalo	4,475	255,664	360,000	12.43	425		63	38	21	198	71
Cambridge	28	1,598	1,600	17.50	3		2				
Canajoharie	60	2,089	4,300	13.95	5						
Canton	98	2,580	6,195	15.82	40	1			1		
Cape Vincent	25	1,324	1,308	19.11	1		1				
Castile	25	1,146	2,400	10.42	7		1				
Catskill	74	4,920	5,365	13.05	3					2	
City Island	12	1,206	1,388	8.65	1					1	
Clifton Springs	32	1,297	1,537	20.85	2					1	
Clinton	17	1,269	1,100	15.45	3		2				
Cobleskill	53	1,822	3,436	15.42	6		3			1	
Cohoes	474	22,509	26,000	18.23	59		14			48	
Cooperstown	35	2,657	2,358	14.80	7					1	
Corning	132	8,550	12,000	11	6		4			1	3
Coxsackie	89	1,611	3,824	23.27	12				1	3	
Cuba	30	1,386	3,000	10	1						
Dansville	68	3,758	4,500	15.11	8						
Delhi	45	1,564	3,000	15	4		1				

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Pneumonia.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
New York—Continued.											
Dobbs Ferry	34	2,083	2,800	12.14	4						
Dundee	15	1,200	1,320	11.38							
Dunkirk	123	9,416	12,500	9.84	8		1				
East Syracuse	23	2,231	2,518	9.14	5			1		2	
Elmira	496	30,893	40,000	12.40	31		4		1	1	3
Fairport	27	2,552	3,000	9	4						
Fayetteville	33	1,410	1,300	25.37	6		1				
Fishkill on the Hudson	78	3,617	4,000	19.70	3					1	
Frankfort	63	2,291	2,800	22.50	6						
Franklinville	10	1,021	1,250	8	1						
Fredonia	57	3,399	3,800	15	6					1	
Fulton	111	4,214	6,500	17.08	3		2				
Fultonville	3	1,122	1,006	2.99	1						
Geneva	157	7,557	10,861	14.43	13		4			3	1
Geneseo	13	2,286	3,500	3.71	4						
Gloversville	284	13,864	14,694	19.33	23		4			4	
Goshen	85	2,907	4,500	18.89	8					1	
Greenbush	144	7,301	7,500	19.20	15		5			6	
Greenwich	43	1,663	2,135	20.14	5		1				
Hamilton	36	1,744	2,000	18						1	
Hancock	50	1,279	4,000	12.50	4		1			2	
Hastings on the Hudson	26	1,463	1,700	15.29	5		1				
Holley	22	1,381	1,472	14.95	3		1				
Honeoye Falls	25	1,128	1,280	19.53	1					1	
Horseheads	28	1,716	1,900	14.74			1				3
Hudson	188	9,970	10,000	18.80	23		3			4	2
Huntington	106	3,028	8,253	12.84	10				1	1	
Hion	63	4,057	4,661	13.62	6		1				
Irrington	20	2,299	2,013	9.93	2				1		
Ithaca	187	11,079	15,000	12.47	24						1
Kingston	408	21,261	23,000	17.74	46		3		1	10	1
Lancaster	40	1,692	3,500	11.43	2		2				
Leroy	31	2,743	3,100	10	2		1				
Lima	40	1,003	2,300	17.43	6						
Little Falls	111	8,783	10,000	11.10	9		2				
Lockport	267	16,038	18,000	14.83							
Malone	97	4,986	5,600	17.32	3					1	
Marathon	27	1,198	1,116	24.19	1			1			
Middleburg	45	1,130	1,128	39.89	3		2				
Middleport	15	1,217	1,383	10.85							
Middletown	295	11,977	15,000	19.67	26		4	1	2	6	2
Montgomery	14	1,024	1,030	14	4						
Monticello	14	1,016	1,035	13.53	2						
Moriah	37		2,500	14.80	1		2				
Mount Morris	38	2,286	2,200	17.27	1					4	
Naples	15	1,266	2,800	5.36	1				1		
Newark	50	3,698	4,500	11.11	11		1			1	
Newburgh	472	23,087	26,000	18.15	55		3			14	2
New York	38,877	1,515,301	1,990,562	19.53	4,843	24	229	391	500	1,590	308
New York Mills	21	2,552	1,400	14	5		1				
Niagara Falls	241	5,502	20,000	12.05	5		12			11	1
North Tarrytown	61	3,179	4,000	15.25	4				1	2	
North Tonawanda	121	4,793	9,000	13.41	1		7			1	2
Norwich	86	5,212	6,004	14.32	3				1	5	
Norwood	17	1,463	1,735	9.80	5		2				
Nunda	31	1,010	3,000	10.33			1				
Nyack	52	4,111	5,603	9.28	4		1			1	
Oneonta	155	6,272	10,000	15.50	18		4			14	
Palmira	75	2,131	4,000	18.75	8		2				1
Peekskill	164	9,676	11,000	14.91	17		2			8	
Perry	56	1,528	3,500	16	6		1				
Phenix	43	1,465	1,700	25.29	2		2				
Philmont	19	1,818	2,016	9.43	2		1				
Port Byron	36	1,105	1,800	20	6						
Port Ewen	26	1,211	1,000	26	1					2	
Potsdam	83	3,961	5,000	16.60	11		3				
Pulaski	24	1,517	1,577	15.22	5						
Randolph	22	1,201	1,200	18.33	1						
Rhinebeck	61	1,649	3,400	17.65	5					8	

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
New York—Continued.											
Richfield Springs.....	45	1,623	1,650	27.27	4	—	1	—	—	1	—
Rosendale.....	145	1,706	6,125	23.67	1	—	—	1	—	6	—
Roslyn.....	141	1,251	10,000	14.10	13	—	—	—	—	3	—
Sandy Hill.....	40	2,895	4,100	9.76	3	—	—	—	1	—	—
Saratoga Springs.....	291	11,795	12,000	24.25	16	—	5	—	—	13	—
Saugerties.....	169	4,237	11,000	15.36	26	—	3	—	—	—	—
Schaghticoke.....	70	1,258	3,500	20	9	—	5	—	—	—	—
Schuylerville.....	27	1,387	1,300	20.77	—	—	1	—	—	—	1
Sidney.....	53	1,358	2,600	20.38	3	—	—	—	—	1	—
Skaneateles.....	22	1,559	1,526	14.42	4	—	—	—	—	1	—
Sodus.....	79	1,028	5,000	15.80	10	—	—	—	—	—	—
South Glens Falls.....	48	1,606	2,007	23.91	9	—	1	—	—	—	—
St. Regis Falls.....	22	1,210	2,000	11	—	—	—	—	—	—	—
Syracuse.....	1,711	88,143	125,000	13.69	202	—	38	3	37	39	3
Ticonderoga.....	60	2,267	5,000	12	8	—	3	—	—	—	—
Tonawanda.....	97	7,145	8,000	12.12	11	—	3	—	—	13	—
Trumansburg.....	25	1,211	1,232	20.29	2	—	1	—	—	—	—
Utica.....	772	44,007	55,000	14.04	108	—	6	—	5	29	1
Valatie.....	17	1,437	1,164	14.66	2	—	—	—	—	1	—
Walden.....	36	2,132	3,000	12	—	—	—	—	—	—	—
Walton.....	59	2,229	5,000	11.80	3	—	2	—	—	—	—
Wappinger Falls.....	62	3,718	3,500	17.71	10	—	—	—	—	1	—
Warsaw.....	59	3,120	4,200	14.05	2	—	4	—	—	1	—
Watertown.....	343	14,725	21,000	16.33	16	—	14	1	2	1	—
Waterville.....	25	2,024	1,700	14.71	4	—	—	—	—	4	—
Weedsport.....	27	1,580	2,000	13.50	2	—	—	—	—	1	—
Wellsville.....	39	3,435	3,800	10.26	5	—	—	—	—	—	—
Whiteplains.....	134	4,042	7,361	18.20	14	—	—	—	—	1	—
Whitestown.....	61	2,808	5,225	11.68	5	—	2	—	—	—	—
Yonkers.....	743	32,033	40,000	18.58	79	—	6	—	3	63	2
Total.....	79,960		4,527,168	17.66	9,054	28	862	641	773	3,229	585
North Carolina:											
Fayetteville.....	64	4,222	6,000	10.67	10	—	3	—	—	—	—
Goldsboro.....	93	4,017	5,700	16.32	9	—	3	4	—	—	—
Greensboro.....	145	3,317	8,000	18.13	24	—	6	—	—	—	15
Henderson.....	43	4,191	4,250	10.12	10	—	2	—	—	—	—
Hendersonville.....	6	1,216	1,600	3.75	—	—	—	—	—	—	—
Kinston.....	34	1,726	3,500	9.71	4	—	2	1	—	—	—
Monroe.....	27	1,866	2,400	11.25	1	—	1	—	—	—	—
Newbern.....	250	7,843	9,000	27.77	18	—	4	—	—	—	—
Newton.....	18	1,038	1,500	12	2	—	1	—	—	—	—
Oxford.....	41	2,907	2,500	17.83	6	—	1	1	—	—	—
Raleigh.....	220	12,678	15,000	14.67	38	—	3	—	—	3	3
Rockingham.....	22	1,535	1,750	12.57	1	—	5	—	—	—	—
Rockymount.....	14	1,870	2,600	5.39	2	—	—	—	—	—	—
Salem.....	50	2,711	4,550	10.96	2	—	—	—	—	—	—
Salisbury.....	212	4,418	5,500	20.36	18	—	9	—	—	—	—
Southport.....	18	1,207	1,200	15	2	—	—	3	—	—	—
Tarboro.....	25	1,924	2,500	10	4	—	2	—	—	—	—
Washington.....	85	3,545	5,500	15.46	10	—	5	—	—	—	—
Weldon.....	22	1,286	1,450	15.10	1	—	1	—	—	—	—
Wilmington.....	522	20,056	25,000	20.88	54	—	12	—	—	—	12
Wilson.....	44	2,126	4,500	9.78	5	—	1	2	—	—	—
Winston.....	217	8,018	10,000	21.70	48	—	6	—	1	—	18
Total.....	2,172		123,800	17.54	269	—	67	11	1	3	48
North Dakota:											
Bismarck.....	35	2,186	3,500	10	2	—	1	—	—	3	—
Total.....	35		3,500	10	2	—	1	—	—	3	—
Ohio:											
Ada.....	24	2,079	2,700	8.52	4	—	2	—	—	1	—
Alliance.....	91	7,607	8,500	10.71	10	—	—	—	2	9	—
Antwerp.....	10	1,331	1,500	6.67	2	—	1	—	—	1	—
Arcanum.....	36	1,134	1,500	24	2	—	—	—	1	—	—
Ashtabula.....	142	8,338	12,000	11.83	9	—	2	—	—	2	—
Athens.....	34	2,620	3,500	9.71	5	—	—	—	—	—	—

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

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					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Ohio—Continued.											
Barnesville	58	3,207	4,000	14.63			3				
Bellaire	116	9,934	10,000	11.60	13		6		2		1
Bluffton	12	1,230	1,800	6.67							
Bradford	31	1,338	1,600	19.31	6		4				
Brooklyn	22	4,585	1,796	12.25			1			2	
Bryan	33	3,068	4,000	8.25	7					1	
Bucyrus	72	5,974	7,000	10.29	11		4			3	
Cadiz	24	1,716	2,000	12	4						
Caldwell	2	1,248	1,360	7.35	1						
Cambridge	63	4,361	8,000	7.88	10		2		1	3	
Canton	284	26,189	40,000	7.10	29		20			10	3
Cardington	16	1,428	1,600	16						4	
Carey	15	1,605	2,000	7.50							
Carrollton	16	1,228	1,500	10.67	3		1			3	
Carthage	24	2,257	2,500	9.60	3						
Celina	68	2,702	3,500	19.43	2		1	8	3	4	1
Chillicothe	229	11,288	15,000	15.27	25		11			11	
Cincinnati	5,565	296,908	405,000	13.74	675		101	18	16	135	34
Circleville	110	6,556	7,000	15.73	5		5			1	
Clyde	43	2,327	3,000	14.33	6		1				
Columbiana	26	1,112	1,500	17.33	1		1				
Columbus	1,219	88,150	135,000	9.03	201		29	2	6	18	
Conneaut	59	3,241	5,000	11.80	8					3	
Coshocton	56	3,672	5,000	11.20	7				1		
Cuyahoga Falls	28	2,614	3,500	8			1			1	
Degraff	9	1,076	1,300	6.92	2		1				
Delaware	85	8,224	9,000	9.44	15		3				
Delta	12	1,132	1,400	8.57							
Doylestown	10	1,131	1,200	8.33	2					1	
East Liverpool	154	10,956	15,000	9.74	14		9	6		5	3
East Palestine	11	1,816	24,000	4.58	2						1
Eaton	80	2,934	3,000	26.67							
Elmore	6	1,198	1,200	5	2					1	
Fairport	28	1,171	1,570	17.83							
Findlay	193	18,553	20,000	9.65	30		8		1	4	
Forest	7	1,126	1,400	5	1		1				
Franklin	30	2,729	3,000	10	3						
Fremont	82	7,141	8,000	10.25	8		3			6	
Galion	60	6,326	8,500	7.06	8				1	1	1
Gallipolis	118	4,498	6,000	19.67	15		2	1		3	
Geneva	28	2,194	2,800	10	3		1				
Germantown	16	1,437	2,000	8	1		1			1	
Glendale	24	1,444	1,447	16.59	2						
Greenville	54	5,473	6,000	9	6		3		1	4	
Hamilton	328	17,565	24,000	13.67	43		3		2	2	
Hartwell	18	1,507	2,000	9	3		1				
Hicksville	10	2,141	2,000	5	3		2				
Hillsboro	21	3,620	4,800	4.38	3		4				
Holgate	15	1,134	1,300	11.54	1						
Hudson	19	1,143	1,800	10.56	1				1		
Huron	16	1,380	2,000	8							
Ironton	180	10,939	12,000	15	17		12			6	1
Jackson	68	4,320	6,000	11.33	6		8		1	2	1
Kent	56	3,501	4,000	14	7		3				
Kenton	64	5,557	8,000	8	11					3	
Lancaster	123	7,555	10,000	12.30	21		6			1	
Lorain	115	4,863	12,000	9.58	4		4		1	11	1
Lebanon	62	3,050	3,500	17.71	6					1	
Leontonia	37	2,826	3,500	10.57	3		1		3	1	
Leipsic	15	1,353	2,100	7.14	2		2				
Lima	447	15,981	25,000	17.84	34		6		1	17	3
Lockland	31	2,474	3,000	10.33							
Logan	47	3,119	3,500	13.43	9		2				
McComb	11	1,030	1,500	7.33	3						
McConnellsville	29	1,771	1,765	16.43	9						
Manchester	43	1,965	2,500	17.20	10					3	
Marietta	115	8,273	15,000	7.67	4		7			8	3
Marion	96	8,327	12,000	8			4			4	
Martins Ferry	122	6,250	7,000	17.46	17		10		2	4	
Marysville	34	2,810	3,500	9.71	2		1			1	
Massillon	114	10,092	13,000	8.77	13		6			6	2

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					Pneumonia.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Ohio—Continued.											
Miamisburg	38	2,952	4,000	9.50	8		1				
Middleport	47	3,211	3,000	15.67	17					2	
Middletown	98	7,681	10,000	9.80	13	2					
Millersburg	26	1,923	2,000	13	3						1
Minerva	13	1,139	1,300	10	4						
Mingo Junction	20	1,856	2,500	8	2					1	
Montpelier	11	1,293	2,200	5.27	3		1				
Napoleon	34	2,764	4,250	8	4		1		1		
Nelsonville	40	4,558	6,000	6.67	3		3			1	
New Bremen	7	1,239	1,500	4.67			1				
New Lexington	23	1,470	2,000	11.50	5		1			1	
New London	13	1,096	1,500	8.67						1	
New Philadelphia	62	4,456	5,000	12.40	4		2			4	
New Richmond	20	2,379	2,000	10	1					1	
New Straitsville	27	2,782	2,800	9.64	1					1	
Niles	90	4,298	7,000	12.86	2		1		1	3	
North Amherst	12	1,648	2,000	6							
Norwalk	86	7,195	7,500	11.47	10		2	1		8	
Oak Harbor	14	1,681	2,000	7	1		1				
Oberlin	58	4,376	4,600	12.61	7		3				2
Orrville	22	1,765	2,000	11	4		1				
Ottawa	16	1,717	2,300	6.96	2		2				
Painesville	84	4,755	6,000	14	8		2		1		1
Piketon	5	1,022	800	6.25							
Pleasantridge	14	1,027	1,250	11.20							
Plymouth	6	1,133	1,200	5			2				
Pomeroy	60	4,726	5,000	12	3		4				
Portsmouth	231	12,394	18,000	12.83	28		7	1		11	
Ravenna	43	3,417	4,500	9.56	5		1		7		
Sabina	13	1,080	1,500	8.67	2						
Shawnee	36	3,266	4,000	9	6				1		
St. Bernard	54	1,779	2,850	18.95	3		3			15	
St. Mary	60	3,000	6,000	10	6					1	
Salem	69	5,780	8,000	8.63	4		4	1	2	1	11
Salineville	34	2,369	2,800	12.14	1		1	2		3	2
Sidney	48	4,850	5,000	9.60	8					7	
Somerset	16	1,127	1,500	8.67						1	
South Charleston	16	1,041	1,200	13.33	2		1				
Springfield	452	31,895	38,000	11.89	44		14	11	3	21	13
Tiffin	126	10,801	15,000	8.40	17		2				
Ulrichsville	45	3,842	4,500	10	7			2	1	1	
Union	1	1,293	300	3.33	1						
Urbana	83	6,510	8,000	10.38	18				1	5	1
Versailles	18	1,385	1,700	10.59	4						
Wapakoneta	47	3,116	4,500	10.44	6		1				
Warren	83	5,973	10,000	8.03	13		1				
Waverly	50	1,567	2,000	25	1			1	2	1	
Wellington	20	2,069	3,000	6.67	1						
Wellston	84	4,377	10,000	8.40	13		1		2	9	
Wellsville	88	5,247	6,000	14.67	1		3		1	6	
Willoughby	33	1,219	1,500	22						1	
Wilmington	56	3,079	4,000	14	11		2				
Wyoming	13	1,454	1,800	7.22	1						
Xenia	133	7,301	8,500	16	28		1			3	1
Youngstown	463	33,220	50,000	9.26	29		19	6	4	5	2
Total	15,122		1,301,728	11.62	1,758	2	403	62	74	421	90
Oregon:											
Astoria	108	6,184	9,000	12							
Marshfield	220	1,461	20,000	9.09							
Total	328		29,000	11.31							
Pennsylvania:											
Allegheny	1,778	105,287	130,000	13.68	155		79	15	4	41	9
Altoona	587	30,337	42,000	13.98	46		16		3	34	8
Ambler	29	1,073	1,700	17.06	2						
Ashley	75	3,192	3,600	20.83	2					2	
Athens	54	3,274	3,500	15.43			2	2			
Avenue	17	1,453	1,500	11.33				5	2	6	4

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis, pulmonary.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Pennsylvania—Cont'd.											
Avoca	30	3,031	5,000	6	1		1			2	
Beaver Falls	134	9,735	12,000	11.17	19		11			5	
Bellevernon	4	1,147	1,000	4							
Bellevue	23	1,418	3,500	6.43							
Berwick	35	2,701	3,000	11.67						1	
Bethlehem	111	6,762	8,000	13.88	1		3			3	
Blakely	56	2,452	5,000	11.20						6	
Bloomsburg	60	4,635	8,000	7.50					1	4	
Boyetown	19	1,436	2,000	9.50	1						
Braddock	264	8,561	11,000	24			6	3		3	
Bradford	159	10,514	18,500	8.59	10		5			17	
Bridgeport	50	2,651	3,500	14.29						1	
Bristol	103	6,553	7,000	14.72	10					1	
Brookville	23	2,478	2,700	8.52	3						
Brownsville	35	1,417	1,477	23.70							
Butler	137	8,734	11,000	12.45	10		1		1	5	2
Canton	18	1,393	2,000	9	1						
Carlisle	141	7,620	10,500	13.43	12		1	2	1	2	
Catasauqua	42	3,704	3,700	11.35	3		2				1
Catawissa	30	1,809	3,000	6.67							
Centralia	25	2,761	3,000	11.67	2				1	6	
Chambersburg	149	7,863	9,000	16.56	11				3	10	
Chester	374	20,226	25,000	14.96	40		5		4	3	4
Clarendon	4	1,297	400	10	1						
Clarion	18	2,164	2,500	7.20	2						
Connellsville	66	5,629	6,800	9.71			1				
Cressona	30	1,481	1,500	20							
Danville	60	7,998	9,000	6.67			2	1		3	1
Darby	20	2,972	4,000	5							
Dowington	36	1,920	2,074	17.36	2		1				1
East Brady	12	1,228	1,300	9.23						2	1
Elizabethtown	5	1,218	2,000	2.50	1						
Emporium	33	2,147	2,600	12.70	1				2	5	
Erie	624	40,634	57,000	10.95	68		12	3	2	4	1
Etna	64	3,767	3,700	17.30							
Everett	22	1,679	2,000	11							
Fracksville	31	2,520	3,000	10.33	2				1	1	
Franklin	67	6,221	8,000	8.38						2	
Gettysburg	54	3,221	4,000	13.50			2			3	
Greensburg	62	4,202	7,000	8.86	4		4			3	
Hallstead	20	1,167	2,000	10	4						
Harrisburg	600	39,385	50,000	12	45		10		10	14	
Holidaysburg	30	2,975	3,119	9.62							
Honesdale	50	2,816	3,500	14.29							
Houtzdale	12	1,234	2,100	5.71	1		1			2	
Hughesville	15	1,358	1,600	9.38							
Jeannette	61	3,296	7,000	8.73	6					2	
Johnsonburg	31	1,280	3,500	8.86							
Johnstown	369	21,805	27,000	13.70	28		21	4	10	4	3
Kingston	71	2,381	3,200	22.19	1				2	3	
Kittanning	16	3,095	5,000	3.20			2			1	
Knoxville	17	1,723	1,000	17							
Kutztown	6	1,595	1,500	4	1		2				
Lancaster	623	32,011	50,000	12.45	40		36		4	14	
Latrobe	45	3,589	4,000	11.25	4					2	
Lehighton	58	2,959	4,800	12.08	4					2	
Lewistown	18	3,273	3,500	5.14							
Lewisburg	41	3,248	3,300	12.42	6		1			1	
Livitz	24	1,494	1,830	13.39							
Lockhaven	75	7,358	8,500	8.82			1			1	
McDonald	27	1,698	4,500	6						2	
McKeesport	429	20,741	30,000	14.30	11	1	8			22	
McSherrystown	35	1,020	1,500	23.33	9			1		7	
Manheim	27	2,070	2,200	12.27			1				
Meadville	122	9,520	12,000	10.17			1				
Mechanicsburg	60	3,691	4,304	13.92	2		1				
Media	40	2,736	3,500	11.43	2						1
Meyersdale	37	1,847	2,700	13.70	1			1		4	
Millersburg	17	1,527	1,600	10.63	1						
Millerstown	5	1,162	600	8.33							

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Pennsylvania—Cont'd.											
Monongahela	75	4,096	5,000	15	2		4			15	
Montrose	25	1,735	1,800	13.89	1						
Morrellville	12	2,827	3,500	3.43			1	1		1	
Morrisville	14	1,203	1,400	10	1		1			1	
Mount Carmel	290	2,254	12,000	24.17			3	10	1	12	
Mt. Holly Springs	11	1,190	1,250	8.80							
Nesquehoning	24	1,655	2,000	12	1			3		4	
New Brighton	84	5,616	7,000	12	9						
Newcastle	251	11,600	25,000	10.04	1		6			17	3
Newhaven	13	1,221	1,800	7.22	1						
Newtown	18	1,213	1,400	12.86	2						
Norristown	280	19,791	22,500	12.45	25		5			2	7
Northeast	29	1,538	2,500	11.60	1					2	
Northumberland	29	2,744	2,700	10.74	4		1			1	
North Wales	16	1,060	1,200	13.33	1		1			2	
Oil City	132	10,932	15,000	8.80	7		8			6	
Osceola Mills	20	1,750	2,000	10	1					4	
Parkesburg	39	1,514	1,800	20.56							
Phenixville	118	8,514	8,500	13.88	8					5	
Philadelphia	22,735	1,046,964	1,214,256	18.72	2,388		401	64	282	1,474	271
Pine Grove	14	1,103	1,200	11.67	3		184			2	
Pittsburg	4,745	238,617	287,500	16.54	317		2	90	22	135	108
Pittston	228	10,302	20,000	11.40	3		2	5	1	32	1
Port Carbon	27	1,976	2,700	10	1					1	
Quakertown	49	2,169	3,000	16.33	3		2			2	
Reading	1,024	58,661	75,000	13.65	93		24	2		27	
Reynoldsville	36	2,789	3,000	12			1		1	6	
Royersford	8	1,815	2,200	3.63							
St. Clair	151	3,680	6,000	25.17	3			2		14	2
Saltsburg	9	1,088	1,400	6.43							
Scranton	1,552	75,215	105,000	14.78	70		13	22	1	112	5
Scottdale	38	2,693	3,700	10.27			9			2	
Schuylkill Haven	36	3,088	3,800	9.47	3		2		1	1	
Shamokin	294	14,403	20,000	14.70	16		1	23		11	
Sharpsburg	85	4,898	7,000	12.14			3		3	4	
Sharpville	30	2,330	3,000	10	1						
Shippensburg	29	2,188	4,000	7.25	6		1				
Somerset	27	1,713	2,400	11.25							
South Bethlehem	209	10,302	14,000	14.93	20		4		2	15	6
South Fork	34	1,295	2,500	13.60	1			5		6	
Steelton	161	9,250	10,000	16.10						3	
Sugar Notch	14	2,586	1,783	7.85			2				
Sunbury	121	5,950	10,000	12.10			6	2		2	
Susquehanna	56	3,872	4,000	14							
Tarentum	72	4,627	5,000	12.40			2				
Tidioute	15	1,328	1,500	10			1				
Towanda	60	4,169	5,000	12	5					2	
Tremont	37	2,064	2,200	16.81						12	
Tunkhannock	20		2,500	8							
Tyrone	82	1,253	7,000	11.71			2			7	
Upland	34	2,275	2,000	17	6					2	
Verona	24	1,477	2,000	12	3						
Washington	104	7,063	8,500	12.24			1	3			
Waynesboro	30	2,101	3,000	10							
Weatherly	52	2,961	4,000	13			1				
Wellsboro	30	2,961	2,900	10.34	1		1			1	
West Bethlehem	43	2,759	4,000	10.75					1	1	1
West Bridgewater	12	1,177	1,200	10	1		1				
West Conshohocken	44	1,666	2,500	17.60			2				1
West Fairview	13	1,137	1,200	10.83						1	
West Newton	33	2,285	3,500	9.43	5		1			1	
West Pittston	88	3,906	6,450	12.39	3		2		3	2	
Wilkesbarre	709	37,718	55,000	12.89	3		15		12	37	
Wilkinsburg	84	4,662	14,000	6			2				
Williamsport	231	27,132	35,000	6.60	19	1	7			4	1
Wrightsville	24	1,912	2,400	10							
York	361	20,793	25,615	14.09	27		12	4	4	22	1
Total	44,045		2,816,450	15.64	3,649	2	982	275	383	2,281	422

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Rhode Island:											
Barrington	22	1,461	1,723	12.77			1				
Bristol	130	5,478	6,934	18.75	10		1		1	1	
Burrillville	92	5,492	5,734	15.91	13			4	1		
Central Falls	223	15,828	16,892	13.20	18						1
Coventry	103	5,068	5,092	20.21	9		1			2	3
Cranston	183	3,069	9,714	18.85	22		3			4	3
Cumberland	166	3,090	6,782	24.48	33		1	1		3	1
East Greenwich	163	3,127	3,176	18.26	13						1
East Providence	163	8,422	10,987	14.84	10		2	1	2	2	3
Foster	28	1,252	1,147	24.41	1						
Glocester	30	2,095	1,610	18.63					1		
Hopkinton	46	2,864	2,692	17.08	6						
Johnston	204	9,778	12,182	16.75	20		1	1		4	2
Lincoln	110	20,355	8,912	12.34	16			1		6	1
Little Compton	22	1,128	1,123	19.59	1		1				
Middletown	14	1,154	1,413	9.91							
Newport	356	19,457	21,500	16.56	41		2		1	4	9
New Shoreham	24	1,320	1,305	19.16	2					2	
North Kingstown	63	4,193	4,913	12.82	7						
North Providence	40	2,084	2,500	16	1					1	
North Smithfield	52	3,173	3,900	17	16					6	
Pawtucket	600	27,633	35,000	17.14	62		9	3	1	29	2
Portsmouth	19	1,949	1,883	10.09	2						
Providence	2,805	132,146	154,000	18.18	321		24	18	11	91	16
Richmond	27	1,669	1,636	16.50	1					1	1
Scituate	68	3,174	3,504	19.41	6						
Smithfield	41	2,500	2,327	17.54	8		2				
South Kingstown	71	6,231	5,320	13.35	1		1			1	1
Tiverton	45	2,837	3,027	14.87	1		2			1	1
Warren	79	4,489	4,500	17.56	7			1		3	
Warwick	336	17,761	23,117	15.83	29		1	1	1	16	4
Westerly	125	6,813	7,913	15.69	5		5		1	2	2
Woonsocket	464	20,830	26,000	17.84	54		5	1	1	50	2
Total	6,839		397,618	17.19	723		65	32	25	232	29
South Carolina:											
Aiken	47	2,362	3,000	15.67	11						
Camden	26	3,533	3,500	7.43	3						
Charleston a	1,590	54,955	65,165	24.39	184		40		6	2	15
Florence	96	3,395	5,500	17.46			3			3	1
Greenville	150	8,607	12,000	12.50	17		2				3
Newberry	40	3,020	5,000	8	9		1				
Pelzer	49	1,878	6,000	8.17							
Rock Hill	20	2,744	5,000	4							
Summerville	37	2,219	3,000	12.34	6						
Total	2,050		108,165	18.95	230		66	32	25	232	29
South Dakota:											
Canton	7	1,101	1,800	3.89	1						
Deadwood	36	2,366	6,000	6	3					4	
Sioux Falls	87	10,177	10,000	8.70	9		5	1		1	2
Vermilion	22	1,496	2,500	8.80	3					1	
Total	152		20,300	7.48	16		5	1		6	2
Tennessee:											
Coal Creek	85	1,865	2,500	34	6		11	2		5	
Henderson	25	1,069	2,000	12.50			6				
Jackson b	243	10,639	16,000	15.19	40		50	10		7	10
Lebanon	50	1,883	3,000	16.67						1	
McMinnville	6	1,677	3,000	2	4		1				
Maryville	30	1,686	3,000	10	7		5			2	
Nashville	1,636	76,168	87,754	18.64	220		45	3		20	3

a 447 white and 1,143 colored and black. Mortality per 1,000: 15.52 white; 31.49 colored and black.

b White population, 10,000; colored population, 6,000; deaths of white, 110; colored, 133.

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Tennessee—Continued.											
Newbern	33	1,236	1,700	19.41	5	—	3	1	—	1	—
West Nashville	20	1,047	3,500	5.72	2	—	2	—	—	3	—
Total	2,128	—	122,454	17.38	284	—	123	16	—	39	13
Texas:											
Brownsville	207	6,134	6,000	34.50	33	—	1	—	—	—	2
Cleburne	95	3,273	8,000	11.88	8	—	2	—	—	—	2
Colorado	15	1,582	2,000	7.50	2	—	—	—	—	2	—
Corpus Christi	40	4,387	5,000	8	2	—	—	—	—	—	—
Cuero	58	2,442	4,000	14.50	3	—	—	—	—	—	—
Del Rio	8	1,980	1,100	7.27	2	—	3	—	—	—	—
Dublin	10	2,025	4,000	2.50	4	—	—	—	—	1	—
Ennis	35	2,171	6,000	5.83	6	—	2	—	—	2	1
Farmersville	18	1,093	2,000	9	—	—	—	—	—	—	1
Georgetown	20	2,447	4,000	5	4	—	2	—	—	2	—
Hempstead	25	1,671	5,000	5	—	—	—	—	—	—	—
Henrietta	8	2,100	2,000	4	4	—	—	—	—	—	—
Houston	702	27,557	70,000	10.03	79	—	6	—	—	10	2
Lampasas	23	2,408	3,000	7.67	1	—	—	—	—	1	—
Lockhart	20	1,233	2,500	8	—	—	—	—	—	3	—
McKinney	40	2,489	5,000	8	4	—	—	1	—	6	2
Marshall <i>a</i>	96	7,207	9,500	10.11	—	—	—	—	—	—	—
Mineola	12	1,323	2,500	4.80	1	—	1	—	—	—	—
Quanah	8	1,477	1,500	5.33	—	—	—	—	—	—	—
Rio Grande	40	1,968	1,800	22.22	10	—	—	—	—	—	—
San Antonio <i>b</i>	905	37,673	60,000	15.08	62	1	13	1	2	22	2
Vernon	39	2,837	3,000	13	4	—	4	—	—	6	—
Waxahachie	62	3,076	6,500	9.54	4	—	—	—	—	—	—
Total	2,486	—	214,400	11.60	233	1	42	2	2	55	14
Utah:											
Eureka	25	1,733	2,500	10	1	—	2	—	1	—	—
Heber	17	1,538	1,800	9.44	—	—	1	—	—	2	—
Nephi	34	2,034	3,000	11.33	—	—	—	—	—	—	—
Ogden	206	14,889	19,000	19.80	—	—	6	—	1	—	—
Provo	32	5,159	6,000	5.33	—	—	2	8	1	—	—
Salt Lake City	577	44,843	70,000	8.24	44	—	25	—	5	7	—
Smithfield	22	1,080	1,500	14.67	—	—	—	4	—	—	—
Spanish Fork	50	2,214	3,000	16.67	12	—	1	3	—	2	—
Springville	48	2,849	4,000	12	3	—	5	—	—	1	3
Total	1,011	—	110,800	9.12	60	—	42	15	8	12	3
Vermont:											
Alburg	21	1,390	1,390	15.11	4	—	—	—	—	—	—
Arlington	11	1,352	1,360	8.09	2	—	—	—	2	—	—
Bakersfield	28	1,162	2,000	14	3	—	—	—	—	—	—
Barnet	24	1,987	1,800	13.33	4	—	1	—	—	—	—
Barre	134	6,812	7,000	19.14	8	—	12	3	—	14	—
Bellows Falls	46	1,700	4,000	11.50	5	—	1	—	—	1	—
Bennington	140	6,391	8,000	17.50	24	—	7	—	—	4	—
Berkshire	14	1,421	1,400	10	1	—	—	—	—	—	—
Bethel	25	1,448	2,000	12.50	—	—	1	—	—	2	—
Bradford	21	1,429	2,000	10.50	—	—	—	1	—	—	—
Brandon	52	3,310	3,500	14.86	7	—	2	—	—	—	—
Bridport	12	1,018	1,000	12	—	—	—	—	—	1	—
Brighton	20	2,020	2,000	10	2	—	—	—	—	—	—
Cabot	19	1,074	1,075	17.67	—	—	—	—	—	1	—
Calais	20	1,082	1,000	20	3	—	—	—	—	—	—
Castleton	23	2,396	2,300	10	4	—	—	—	—	—	—
Cavendish	27	1,172	1,172	23.03	1	—	—	—	—	—	—
Charlotte	19	1,240	1,250	15.20	1	—	—	—	—	—	—
Chelsea	24	1,230	1,230	19.51	—	—	—	1	—	—	—
Corinth	15	1,027	1,030	14.56	1	—	—	—	—	—	—
Craftsbury	20	1,271	1,200	16.67	1	—	1	—	—	1	—
Danby	7	1,084	1,000	7	2	—	1	—	—	—	—

a White population, 7,000; colored population, 2,500; white mortality per 1,000, 5; colored, 24.40.*b* Two typhus fever.

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States Census of 1890.	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
Vermont—Continued.											
Derby.....	55	2,900	3,000	18.33	1	—	2	—	—	—	—
Essex.....	32	2,013	2,100	15.24	1	—	—	—	—	1	—
Fairfax.....	14	1,523	1,600	8.75	1	—	—	1	—	—	—
Fairfield.....	21	1,825	1,825	11.51	2	—	—	—	—	1	—
Fairhaven.....	45	2,791	2,700	16.67	6	—	1	—	—	3	—
Groton.....	34	1,040	1,134	29.98	3	—	2	—	—	—	1
Hartford.....	74	3,740	5,000	14.80	11	—	1	—	1	1	—
Hinesburg.....	13	1,205	1,205	10.79	—	—	—	—	—	—	—
Jamaica.....	9	1,074	1,050	8.57	—	—	—	—	—	—	—
Jericho.....	14	1,461	1,461	9.58	1	—	—	—	—	1	—
Lincoln.....	23	1,255	1,255	10.36	—	—	—	—	—	—	—
Londonderry.....	24	1,010	1,170	29.51	1	—	1	—	—	1	—
Ludlow.....	39	1,768	2,000	19.50	2	—	—	—	1	1	—
Lyndon.....	33	2,619	2,800	11.79	7	—	1	1	1	1	—
Manchester.....	31	1,907	2,000	15.50	11	—	—	—	—	—	—
Newhaven.....	16	1,224	1,200	13.33	—	—	—	—	—	—	—
Norwich.....	23	1,304	1,304	17.64	—	—	—	—	—	—	—
Orwell.....	18	1,265	1,300	13.85	1	—	1	—	—	—	—
Pawlet.....	23	1,745	1,745	13.18	2	—	—	—	—	2	—
Pittsford.....	26	1,775	2,000	13	1	—	1	—	—	—	—
Putney.....	11	1,075	1,100	10	2	—	1	—	—	—	—
Ryegate.....	8	1,126	1,100	7.27	2	—	—	—	—	—	—
Shaftsbury.....	34	1,652	1,650	20.61	—	—	1	—	—	—	2
Shelburne.....	25	1,300	1,300	19.23	—	—	—	—	—	—	—
Sheldon.....	23	1,365	1,350	17.04	1	—	—	1	—	—	—
Springfield.....	35	2,881	3,500	10	2	—	—	—	—	—	—
St. Albans.....	112	7,771	8,000	14	27	—	1	—	—	8	—
Swanton.....	70	3,231	3,500	20	5	—	—	6	—	1	—
Thetford.....	12	1,287	1,200	10	—	—	—	—	—	—	—
Topsham.....	25	1,187	1,200	20.83	3	—	—	—	—	—	—
Tracy.....	31	1,673	1,800	17.22	—	—	—	—	—	—	—
Tunbridge.....	16	1,011	1,000	16	3	—	—	—	—	—	—
Underhill.....	28	1,301	1,300	21.54	4	—	—	2	—	—	—
Vergennes.....	33	1,773	1,800	18.33	5	—	—	1	—	—	1
Wallingford.....	25	1,773	1,700	14.71	5	—	—	1	—	—	—
Westminster.....	23	1,265	1,050	21.90	2	—	—	1	—	—	—
West Rutland.....	44	3,680	3,500	12.57	1	—	—	—	—	4	—
Whitingham.....	22	1,190	1,191	18.47	2	—	—	—	—	1	—
Wilmington.....	23	1,106	1,200	19.17	2	—	—	—	—	1	—
Windsor.....	36	1,846	2,000	18	1	—	—	6	—	—	—
Total.....	1,925	—	126,997	15.16	191	—	41	25	5	55	5
Virginia:											
Bedford City.....	48	2,897	3,000	16	12	—	2	—	—	—	2
Lynchburg.....	363	19,709	30,000	12.10	51	—	7	3	—	—	13
Newport News.....	193	4,449	15,000	12.87	14	—	12	—	—	2	4
Petersburg.....	475	22,680	25,000	19	46	—	11	2	—	1	12
Pocahontas.....	52	2,953	4,000	13	17	—	3	—	—	1	—
Portsmouth.....	292	13,268	17,500	16.69	21	—	7	2	—	5	4
Staunton.....	71	6,975	10,000	7.10	11	—	1	—	1	—	—
Westpoint.....	10	2,018	1,000	10	—	—	—	—	—	—	—
Total.....	1,504	—	105,500	14.26	172	—	43	7	1	9	35
Washington:											
Aberdeen.....	9	1,638	2,500	3.60	1	—	—	—	1	—	—
Chehalis.....	14	1,369	2,000	7	2	—	2	—	—	—	—
Dayton.....	15	1,880	2,500	6	—	—	—	—	—	—	—
Hoquiam.....	6	1,302	2,000	3	2	—	—	—	—	—	—
Olympia.....	8	4,698	4,500	1.78	—	—	1	—	—	—	—
Port Townsend.....	30	4,558	2,000	15	2	—	1	—	—	—	—
Seattle.....	413	42,837	60,000	6.88	43	—	18	—	1	7	4
Tacoma.....	284	36,006	50,000	5.68	7	—	4	—	—	3	4
Vancouver.....	35	3,545	3,600	9.72	6	—	4	—	—	8	—
Walla Walla.....	106	4,709	9,000	11.78	22	—	1	1	1	1	—
Total.....	920	—	138,100	6.66	85	—	31	1	3	19	8

a White mortality, 8.9 per 1,000; colored, 13.6.

TABLE OF ANNUAL MORTALITY STATISTICS IN 1,597 CITIES AND TOWNS IN THE UNITED STATES, ETC.—Continued.

Cities or towns.	Total deaths from all causes.	Population, United States (Census of 1890)	Estimated population.	Annual mortality per 1,000 of the estimated population.	Deaths from—						
					Phthisis pulmonalis.	Smallpox.	Enteric fever.	Measles.	Scarlet fever.	Diphtheria and membranous croup.	Whooping cough.
West Virginia:											
Benwood.....	68	2,934	4,000	17	4	—	1	—	—	—	—
Buckhannon.....	12	1,403	2,000	6	2	—	3	—	—	—	—
Huntington.....	148	10,108	15,000	9.87	21	—	6	—	1	7	—
Keyser.....	5	2,165	3,000	1.67	1	—	3	—	—	1	—
Wellburg.....	80	2,235	3,000	26.67	7	—	2	—	—	1	—
Wheeling.....	602	34,522	38,000	15.84	69	—	18	10	1	13	3
Total.....	915	—	65,000	14.08	104	—	33	10	2	22	3
Wisconsin:											
Antigo.....	43	4,424	5,000	8.60	—	—	—	—	—	—	—
Ashland.....	182	9,956	18,000	10.11	20	—	2	—	—	11	—
Bayfield.....	10	1,373	1,800	5.56	4	—	—	—	—	—	—
Burlington.....	22	2,043	2,400	9.17	3	—	1	—	—	1	—
Centralia.....	35	1,435	2,045	17.11	2	—	1	—	—	2	—
Chippewa Falls.....	112	8,670	9,000	12.44	8	—	1	3	—	—	5
Clintonville.....	12	1,466	1,700	7.06	1	—	—	—	—	2	—
Cumberland.....	16	1,219	1,400	11.43	3	—	1	—	—	—	—
Darlington.....	21	1,589	2,100	10	1	—	—	—	1	—	—
Depere.....	62	3,625	3,600	17.22	7	—	—	1	—	5	—
Dodgeville.....	16	1,722	2,000	8	3	—	—	—	—	—	—
Durand.....	40	1,154	1,500	26.67	5	—	—	—	2	2	—
Elroy.....	20	1,413	1,500	13.33	5	—	2	—	—	—	—
Evansville.....	22	1,523	2,000	11	2	—	—	—	—	—	—
Fond du Lac.....	163	12,024	16,000	10.19	—	—	—	—	1	2	—
Fort Atkinson.....	25	2,283	2,800	8.93	3	—	—	—	—	—	—
Greenbay.....	199	9,069	22,000	9.05	12	—	2	—	—	14	1
Hayward.....	28	1,349	1,600	17.50	3	—	—	—	—	—	3
Jefferson.....	20	2,287	3,000	6.67	3	—	1	—	—	—	—
Kaukauna.....	65	4,607	6,000	10.83	12	—	—	1	—	—	—
Kewaunee.....	18	1,216	1,530	11.76	18	—	—	—	—	—	—
Lake Geneva.....	30	2,297	2,500	12	4	—	—	—	—	1	—
Lancaster.....	27	1,543	2,250	12	1	—	—	—	—	—	2
Manitowoc.....	129	7,710	10,500	12.29	8	—	3	—	—	4	12
Mauston.....	17	1,343	1,700	10	1	—	—	—	—	—	—
Mazomanie.....	9	1,094	1,500	6	1	—	—	—	—	—	—
Medford.....	3	1,193	2,000	1.50	—	—	—	—	—	—	—
Menasha.....	40	4,581	8,000	5	—	—	—	—	—	—	—
Milwaukee.....	3,606	204,468	275,000	13.11	346	—	31	36	3	138	19
Oconto.....	59	5,219	6,000	9.83	8	—	—	—	—	1	1
Oshkosh.....	250	22,836	30,000	8.33	23	—	3	1	—	1	—
Platteville.....	23	2,740	3,500	6.57	6	—	—	—	—	—	1
Port Washington.....	38	1,659	3,000	12.67	3	—	1	—	—	1	—
Prairie du Chien.....	48	3,131	3,200	15	6	—	2	5	—	2	3
Reedsburg.....	13	1,737	2,500	5.20	2	—	—	1	—	1	—
Rhineland.....	32	2,658	5,000	6.40	3	—	—	—	—	—	—
Rice Lake.....	38	2,130	4,000	9.50	4	—	—	—	—	—	—
Richland Center.....	20	1,819	2,500	8	4	—	—	—	—	1	—
Sheboygan.....	268	16,359	24,000	11.17	21	—	2	1	2	7	2
Shullsburg.....	17	1,393	1,400	12.14	—	—	—	—	—	—	1
Superior.....	264	11,983	35,000	7.54	43	—	12	—	1	6	—
Tomah.....	20	2,199	3,000	6.67	3	—	—	—	—	—	—
Tomahawk.....	16	1,816	2,600	6.16	—	—	1	—	—	—	—
Two Rivers.....	57	2,870	5,400	10.56	6	—	2	—	1	7	—
Waupaca.....	31	2,127	3,000	10.33	1	—	—	—	—	1	—
Westbend.....	25	1,296	3,000	8.33	1	—	2	—	—	1	—
Whitewater.....	70	4,359	3,500	20	6	—	—	—	—	—	—
Williamsburg.....	60	3,133	3,800	15.79	—	—	—	—	—	2	—
Total.....	6,341	—	554,825	11.43	630	—	70	49	11	241	40
Wyoming:											
Buffalo.....	4	1,087	750	5.33	—	—	—	—	—	—	—
Total.....	4	—	750	5.33	—	—	—	—	—	—	—

TRANSPORTATION OF DEAD BODIES IN THE UNITED STATES.

During the past summer many inquiries were received in regard to the shipment, from Cuba and other points, of the bodies of those who died during the Spanish-American war. The following correspondence shows the nature of the replies sent, the requirements of State and local authorities being published in the Public Health Reports:

WAR DEPARTMENT,

Washington, D. C., August 3, 1898.

DEAR SIR: The Department is in receipt of numerous communications from relatives and friends of officers and enlisted men who have lost their lives in the Santiago campaign relative to the transportation of their remains to this country. It has been found impracticable to deal satisfactorily with requests of this character, owing to the uncertainty which exists as to the bearing of the quarantine regulations upon the matter.

Advices are desired as to whether the bringing of such remains from fever-infected districts conflicts with the quarantine regulations, and the Department would therefore be pleased to receive, at an early date, expression of your views regarding this question.

Very respectfully,

G. D. MEIKLEJOHN,

Assistant Secretary of War.

The SECRETARY OF THE TREASURY.

TREASURY DEPARTMENT,

Washington, D. C., August 18, 1898.

SIR: In reply to your letter of the 3d instant, desiring to be advised whether the bringing into the United States of the remains of officers and enlisted men who have lost their lives in the Santiago campaign conflicts with quarantine regulations, I have to say that each State or municipality has its own quarantine regulations governing such importation, and I would respectfully suggest that relatives and friends desiring the return of bodies be informed that application should be made to the health officer of the port where bodies are desired to be landed, who will furnish all the information necessary. If the bodies are to pass through one State into another, similar information will have to be obtained from each State respectively.

Respectfully, yours,

W. B. HOWELL,

Acting Secretary.

NATIONAL QUARANTINE REGULATIONS CONCERNING BODIES OF THOSE DYING FROM CERTAIN INFECTIOUS DISEASES.

The United States Quarantine Regulations provide for the proper treatment of bodies of those who have died at sea from cholera, yellow fever, typhus fever, or smallpox, as follows:

REGULATIONS TO BE OBSERVED AT FOREIGN PORTS, ETC.

ARTICLE VI, PAR. 7. The dead should be enveloped in a sheet saturated with one of the strong disinfecting solutions, without previous washing of the body, and at once placed in a coffin hermetically sealed, or buried at sea.

The regulations to be observed at ports and at the frontiers of the United States define clearly what shall be done with the bodies of those dying of cholera, viz:

ARTICLE VI, PAR. 9. The body of no person dead of cholera shall be allowed to pass through quarantine. The body should be cremated if practicable. If not, it should be wrapped, without preliminary washing, in a sheet saturated with a solution of bichloride of mercury, 1 to 500, and buried, surrounded by caustic lime.

The Interstate Quarantine Regulations state as follows on the subject of the transportation of the bodies of those dead from quarantinable disease:

ARTICLE III, PAR. 5. The body of any person who has died of a quarantinable disease shall not be transported save in hermetically sealed coffins, and by the order of the State or local health officer.

STATE REGULATIONS.

In order to ascertain clearly the State regulations, if any, on this subject of transportation of dead bodies, either from one locality in a State to another in the same State or from one State to another, I addressed the following letter to the various State boards of health throughout the country:

WASHINGTON, D. C., *August 24, 1898.*

SIR: I have to respectfully request that you will furnish this Bureau with a copy of the laws and regulations governing the admission to and transit through your State of bodies of persons dying of contagious disease or otherwise.

An early reply is desired for the reason that many inquiries are made of this Bureau from friends of soldiers who die in Cuba and Porto Rico, who wish the bodies returned to the United States.

Respectfully, yours,

WALTER WYMAN,
Supervising Surgeon-General, U. S. M. H. S.

Replies were received from a majority of the States, and the following abstracts of the same were prepared and published, as before stated:

ARKANSAS.

No body of any person dying of contagious disease is permitted shipment into or through the State except in very cold weather, and then it must be accompanied by a certificate that it has been thoroughly disinfected and the coffin hermetically sealed and incased in a close box. Under these conditions a permit will be issued, provided there be no delay in transit.

COLORADO.

The State board of health has adopted in full the rules and regulations formulated and recommended by the combined committees representing the National Conference of State Boards of Health, the National Association of Undertakers, and the National Association of Baggage Masters.

CONNECTICUT.

According to section 113 of the general statutes, a dead body is allowed transportation from or into the limits of any town in the State, provided there be attached to the coffin or case containing such body a written or printed permit

certifying the cause of death or disease of which such person died and the town in which such person is to be buried, and further certifying, in case said disease is shown on the permit to have been cholera, yellow fever, membranous croup, diphtheria, typhus fever, enteric fever, scarlet fever, measles, leprosy, smallpox, or other pestilential disease, that the body is inclosed in an air-tight coffin or case hermetically sealed, and that it has been disinfected in accordance with the method prescribed from time to time by the State board of health.

DISTRICT OF COLUMBIA.

The transportation of the body of any person who has died of Asiatic cholera, yellow fever, typhus fever, smallpox (including varioloid), plague, leprosy, or glanders is absolutely forbidden. Transportation of bodies must be based upon a permit issued by the health officer.

FLORIDA.

No human remains shall be disinterred or removed from any place of interment in this State, or brought into or carried through this State for burial without the permission of the State board of health.

All bodies prepared for transportation must be placed in an air-tight zinc, tin, copper, or lead-lined coffin, or in an air-tight casket hermetically sealed (soldered) and all inclosed in a strong, tight, wooden box. A certificate from the attending physician stating the date and cause of death, and a certificate from the agent of the State board of health or other State health authority, granting permission for removal, must in all cases accompany the casket containing the remains.

ILLINOIS.

Rule 1. The transportation of bodies dead of smallpox, Asiatic cholera, yellow fever, typhus fever, or bubonic plague is absolutely forbidden.

Rule 2. The bodies of those who have died of diphtheria (membranous croup), scarlet fever, glanders, anthrax, or leprosy shall not be accepted for transportation unless prepared for shipment by being thoroughly disinfected by (a) arterial and cavity injection with an approved disinfectant fluid, (b) disinfecting and stopping of all orifices with absorbent cotton, and (c) washing the body with the disinfectant, all of which must be done by an embalmer holding a certificate as such approved by the State board of health or other State health authority. After being disinfected as above the body shall be enveloped in a layer of cotton not less than 1 inch thick, completely wrapped in a sheet and bandaged, and incased in an air-tight zinc, tin, copper, or lead-lined coffin, hermetically sealed and inclosed in a strong wooden box.

Rule 3. Bodies dead of typhoid fever or other dangerous communicable disease not mentioned in rules 1 and 2 may be received for transportation when prepared for shipment by filling cavities with an approved disinfectant, washing the exterior of the body with the same, stopping all orifices with absorbent cotton, enveloping the body with a layer of cotton not less than 1 inch thick, wrapping in a sheet, and bandaging and inclosing in an air-tight coffin. This shall apply only to bodies reaching their destination within forty-eight hours. In all other cases such bodies shall be prepared for transportation in conformity with rule 2. When the body is prepared by an embalmer holding a certificate from the State board of health, air-tight sealing may be dispensed with.

Rule 4. Bodies dead of diseases that are not infectious or communicable may be received for transportation when incased in a sound coffin or casket, inclosed in a strong wooden box, provided they reach their destination within thirty hours. If they can not reach their destination within thirty hours they must be prepared according to rule 3. When prepared for shipment by an embalmer holding competent certificate air-tight sealing may be dispensed with.

Rule 5. In cases of contagious, infectious, or communicable diseases the body must not be accompanied by persons or articles which have been exposed to the infection of the disease, unless certified by the health officer as having been properly disinfected. Notice must be sent to the health officer, advising the date and train on which the body may be expected. This notice must be sent by or in the name of the health officer at the initial point.

Rule 6. Every dead body must be accompanied by a person in charge, who must be provided with a passage ticket and also present a full first-class ticket marked "corpse," for the transportation of the body, and a transit permit, showing physician's or coroner's certificate, health officer's permit for removal, undertaker's certificate, name of deceased, date and hour of death, age, place of burial, cause of death, and point of shipment. The transit permit must be made in duplicate with the signatures of all attesting parties. The duplicate copies shall be sent to the secretary of the State or provincial board of health of the State or province from which the shipment was made.

Rule 7. When dead bodies are shipped by express the whole original transit permit shall be pasted upon the outside box and the duplicate forwarded by the express agent to the secretary of the State or provincial board of health of the State or province from which such shipment was made.

Rule 8. Every disinterred body dead from any disease or cause shall be accepted for transportation only when such removal has been approved by the health authorities having jurisdiction where such body is disinterred, and all such disinterred remains shall be inclosed in a hermetically sealed (soldered) zinc, tin, or copper-lined coffin.

INDIANA.

Rules relative to transportation of dead bodies same as those adopted by State of Illinois.

IOWA.

Rules relative to transportation of dead bodies same as those adopted by State of Illinois.

LOUISIANA.

No sanitary code in regard to transportation of bodies has as yet been adopted. Applications for the bringing into or passing through this State of any bodies would have to be passed upon separately.

MAINE.

No body of a deceased person whose death was caused by cholera, yellow fever, diphtheria, scarlet fever, typhus fever, typhoid fever, smallpox, or other pestilential disease shall be transported from place to place within the State unless there shall be attached to the outer case in which the body is inclosed a certificate from the board of health of the locality where the death occurred, stating the cause of death and that proper precautions against infection have been observed.

MICHIGAN.

Regulations relative to transportation of dead bodies substantially the same as those adopted by State of Illinois.

MISSISSIPPI.

Rules relative to transportation of dead bodies same as those adopted by State of Illinois.

NEBRASKA.

No legislation providing for the shipment of dead bodies into or through the State exists. The State board of health has recently passed a resolution to adopt and be governed by the rules formulated by the Association of Western Baggage Agents.

NEW HAMPSHIRE.

The rules adopted by the National Association of General Baggage Agents relative to transportation of dead bodies are in force in this State.

NEW JERSEY.

The body of any person dead of cholera, yellow fever, typhus fever, leprosy, plague, trichinosis, smallpox, typhoid fever, diphtheria, scarlet fever, or any other contagious, infectious, or communicable disease shall be accepted for transportation only when inclosed in a hermetically sealed casket, license for such transport having been obtained from the local board of health of the municipality or township in which the death has occurred.

NEW MEXICO.

No statute exists to cover the transportation of dead bodies.

NEW YORK.

When application is made for a permit to transport a corpse over any railroad or upon any passenger steamboat within the State, the board of health, or the officers to whom such application is made, shall require such corpse to be inclosed in a hermetically sealed casket of metal or other indestructible material, if the cause of death shall have been from a contagious or infectious disease.

NORTH CAROLINA.

The body of a person dying of smallpox, measles, scarlet fever, diphtheria, typhus fever, yellow fever, or cholera must, before acceptance for transportation by any railroad corporation or other common carrier in this State, be enveloped so completely as not to leave any portion of the body whatever exposed in a sheet thoroughly saturated with a solution of bichloride of mercury of not less strength than 1 ounce of the mercury to 1 gallon of water. It shall likewise be incased in an air-tight metallic or metal-lined casket hermetically sealed and inclosed in a tight wooden box of not less than 1 inch in thickness. A certificate from the competent health authority, stating the cause of death and that the body had been prepared in the manner required, shall be delivered in duplicate to the person who receives the body and one copy shall be pasted on the box.

NORTH DAKOTA.

Rule 1. Transportation of bodies dead of smallpox, Asiatic cholera, yellow fever, typhus fever, or bubonic plague is absolutely forbidden.

Rule 2. The bodies of those dead of other dangerous communicable diseases may be shipped into or through this State when inclosed in an air-tight zinc, copper, or tin case; all inclosed in a strong outside wooden box.

Rule 3. The bodies of those dead of diseases that are not communicable may be shipped into or through this State when incased in a sound coffin or casket and inclosed in a strong outside wooden box, provided they reach their destination within thirty hours from time of death: otherwise they must be prepared as indicated in rule 2.

OHIO.

The transportation of bodies of persons dead of smallpox, diphtheria, membranous croup, Asiatic cholera, typhus fever, or yellow fever, except for burial or cremation within the jurisdiction of the health authorities of the municipality or township in which the death has occurred, is strictly forbidden.

The bodies of persons dead of other contagious, infectious, or communicable diseases must be wrapped in a sheet thoroughly saturated with a strong solution

of bichloride of mercury in the proportion of 1 ounce of bichloride of mercury to a gallon of water, and incased in an air-tight zinc, tin, copper, or lead lined coffin, or in an air-tight iron casket, hermetically sealed, and all inclosed in a strong, tight, wooden box.

The bodies of persons dead of diseases that are not contagious, infectious, or communicable may be received for transportation to local points in the same State when incased in a sound coffin or metallic case inclosed in a tight wooden box. But for transportation to points outside the State, unless the time required for transportation does not exceed eighteen hours, they must be incased in an air-tight coffin or casket, metal lined, hermetically sealed, and inclosed in a strong outside wooden box, provided with four iron chest handles.

Every dead body must be accompanied by a transit permit from the competent health authorities and the box containing corpse must be plainly marked with name of deceased, cause and place of death, point of shipment, and number of transit permit issued in connection therewith.

OKLAHOMA TERRITORY.

Regulations similar to those adopted by State of Illinois.

PENNSYLVANIA.

The transportation of bodies of persons who shall have died from smallpox, Asiatic cholera, typhus fever, diphtheria, or yellow fever is strictly forbidden. From October 15 to April 1 all other dead bodies may be transported without restriction, except those which shall have died of scarlet fever, typhoid fever, or measles, which must be inclosed in air-tight zinc, copper, or lead lined wooden boxes, or in air-tight iron caskets, or if in any other form of coffin said coffin must be in a hermetically sealed box, inclosed in a manner satisfactory to the local board of health or health officer.

Every dead body must be accompanied with a physician's certificate of death and a certificate from the shipping undertaker that the body has been prepared for transportation in accordance with the rules of the State board of health of the Commonwealth of Pennsylvania.

Transit permits will be received for bodies shipped from, beyond, or within the States of New York, New Jersey, Delaware, Maryland, West Virginia, or Ohio, or the Province of Ontario without subjecting the body to delay; provided the rules of the State or provincial boards of health do not conflict with any of the preceding rules in these regulations.

TENNESSEE.

The transportation of bodies of persons dead of smallpox, Asiatic cholera, typhus fever, or yellow fever is absolutely forbidden.

The bodies of those who have died of diphtheria, scarlet fever, typhoid fever, erysipelas, measles, or other contagious diseases must be wrapped in a sheet thoroughly saturated with a strong solution of not less than 2 per cent of the bichloride of mercury, and incased in an air-tight zinc, copper, or lead lined coffin, or in an air-tight iron casket, and all inclosed in a strong, tight, wooden box. The coffin or casket must also be surrounded in space between coffin and outside of box by sawdust saturated with a solution of chloride of zinc or bichloride of mercury of same strength as above.

In case of contagious, infectious, or communicable diseases, the body must not be accompanied by persons or articles which have been exposed to infection of the disease. In addition to permit of board of health, agents will require an affidavit from the shipping undertaker, stating how body has been prepared and kind of

casket or coffin used, which must be in conformity with rule 2, and that the health officer of the locality to which the body is consigned has consented to the proposed shipment, and has had timely notice of the hour of its arrival.

The bodies of persons dead of diseases that are not contagious, communicable, or infectious may be received for transportation to local points in same State when incased in a sound coffin or metallic case, and inclosed in a strong wooden box securely fastened, so that it may be easily handled. When it is proposed to transport them for a considerable distance they must be incased in an air-tight, metal-lined coffin or air-tight iron casket. If any other kind of coffin is used the body must be properly embalmed.

Every dead body must be accompanied by a person in charge. The permit must be made out in duplicate, the original to accompany the body to its destination, the duplicate to be retained by the agent at the initial point.

VIRGINIA.

No railroad corporation or other common carrier shall convey, or cause to be conveyed, through or from any city, town, or place in this State the body of any person who died of smallpox, Asiatic cholera, or yellow fever.

The body of any person who died of measles, diphtheria, scarlet fever, or typhoid fever, or other contagious, infectious, or communicable disease, before being offered for transportation, must be wrapped in a sheet thoroughly saturated with a strong solution of bichloride of mercury in the proportion of 1 ounce of bichloride of mercury to 1 gallon of water, and inclosed in an air-tight coffin or casket, hermetically sealed, which shall be incased in a tight wooden box of material not less than 1 inch in thickness. Before any dead body can be received for transportation there shall be presented to the transportation agent a certificate from an undertaker, stating that the regulations have been complied with by him: also a certificate from the local health officer, or where no health officer exists, a practicing physician, stating the name, the place of death, and the disease which caused the death of deceased. This certificate shall be furnished in duplicate. One copy shall be pasted on the box containing the dead body.

WEST VIRGINIA.

Rules relative to transportation of dead bodies are similar to those adopted by the State of Ohio.

HYGIENIC LABORATORY.

REPORT OF THE DIRECTOR.

UNITED STATES MARINE-HOSPITAL SERVICE,
Washington, D. C., November 1, 1898.

SIR: I have the honor to submit the following report of the transactions of the Hygienic Laboratory for the year ending November 1, 1898.

SPECIAL INVESTIGATIONS.

In my previous report, submitted August 15, 1897, a preliminary note was made on the infections caused by the pneumococcus. This investigation has been further continued in the direction of producing a preventive and curative substance for the infections caused by this micro-organism.

This work has been beset with many difficulties, principally due to the fact of the varying susceptibility of a given animal at different times to this organism. These have in a great measure been overcome, and it now appears that this inquiry will be completed in the near future.

A report of progress is to be made on another subject. In 1895 a culture of the pseudo-diphtheria bacillus was received from Dr. Park and W. H. Beebe, of the New York health department. This particular culture figured in their report of that year on diphtheria. Dr. Austin O'Malley, of the health department of the District of Columbia, who was then acting as an assistant in the laboratory, was first assigned to this investigation.

The primary object was to determine whether this micro-organism was a variety of the true diphtheria bacillus. On Dr. O'Malley leaving Washington, the investigation was continued by Dr. Elgin, another assistant, who has brought it to a successful termination.

When this inquiry was undertaken the bacillus of pseudo-diphtheria had no virulence, even to animals most susceptible to diphtheria.

Attempts to raise its virulence were made after the plan as proposed by Bardach, by passing this organism through the bodies of animals (those susceptible to diphtheria), with the result that after two years the cultures began to show virulent properties, and a year later a toxin was extracted, which would kill guinea pigs. During these three years of experimentation the bacillus became more pleomorphic. Many times its morphology was almost identical with the

true bacillus, requiring a most careful study to differentiate from the diphtheria bacillus.

After the successful separation of the toxin, lethal doses were mixed with diphtheria antitoxic serum and injected into guinea pigs with negative results. The experiments proved that this particular micro-organism is distinct from the bacillus diphtheria. A full and detailed report will be rendered on this subject.

Early in 1897 a study of the bacillus typhosus was begun, and is now in progress. While the observations made have been in a great measure confirmatory to those of others, a number of new features have been developed in special lines, which are believed to be of value. It is anticipated that a preventive and curative substance can be evolved which will do away with the objectionable features of vaccination, as proposed by Professor Wright, of Netley.

INVESTIGATION REGARDING ETIOLOGY OF VARIOLA.

The investigation concerning the etiology of variola and its modified form is progressing slowly. This is due in most part to the fact that I have not had sufficient time to devote to it continuously. It is hoped that this subject can claim our undivided attention in the near future and something of a definite character be obtained. Already a mass of material has been collected concerning the methods, both in Europe and in this country, of propagating, preparing, and applying vaccine lymph, which will form a special report.

BACTERIOLOGICAL EXAMINATION OF POTOMAC WATER SUPPLY.

My colleague, Passed Assistant Surgeon Sprague, was assigned to investigation of the pollution of water supplies, and on July 1 of last year began a systematic bacteriological examination of the drinking water of the city of Washington.

A report of observations on the Potomac water supply was submitted in March last, in response to Senate resolution of January 22, 1897, and is published as Senate Document No. 211, Fifty-fifth Congress, second session.

This report is as follows:

WASHINGTON, D. C., *March 21, 1898.*

SIR: In response to your instructions to prepare a report on the subject of the bacteriological examinations of the Potomac River, I have the honor to submit the following synopsis of the investigations which have been conducted in the hygienic laboratory:

The inquiry was commenced as early as 1891, when a bacteriological study was made of the Potomac River water, for the purpose of classifying the bacterial flora.

During this examination a certain group of bacteria, known as the colon group, was observed, which persisted with some degree of regularity, although not in considerable numbers. This was especially noted in the months of the summer and fall.

In the following years investigations of the same character were made in connection with other laboratory subjects, and with identical results.

It is now regretted that the inquiry then undertaken could not have been made continuous, thereby enabling us to reach positive conclusions earlier.

During the years 1892 and 1893, when cholera prevailed in Europe and this country was seriously threatened thereby, special attention was given to the subject of the pollution of water supplies, and that of Washington in particular. I was soon convinced that in the event of cholera gaining a foothold in this country, particularly east of the Allegheny Mountains, the water supply of Washington might be seriously threatened, if not infected with the germs of cholera, and that the possibility of having a repetition of the Hamburg epidemic was not remote. This fact was doubly emphasized in 1894, when an immigrant just landed was reported to have died of cholera in Cumberland, Md., just 125 miles above. Fortunately, the case was not cholera, but it demonstrated how easily a condition might arise under certain conditions which might jeopardize the water supply of Washington.

It is now a well-known fact that Washington has for many years enjoyed an unenviable notoriety in the number of cases of typhoid fever and diarrheal diseases which annually occur. This condition had at last become so persistent and grave that the medical profession had, by its long experience with the disease, become authorities on its treatment. On account of the gradual and persistent increase from year to year, the profession compelled action to be taken with regard to its cause and prevention.

Accordingly in 1894 the Medical Society of the District of Columbia appointed a committee to investigate and report on the cause and prevention of typhoid fever in the District of Columbia.

This committee, after an exhaustive and painstaking investigation, made its report to the society in June of that year, and subsequently presented it to the Congress and it was printed.

The conclusions were as follows:

"1. The immediate abandonment of all wells within the city limits, exception only to be made in case of the absence of the Potomac supply, and where the wells, after repeated chemical and bacteriological examinations, have been found to be free from all possible sources of danger; but even these to be abandoned as rapidly as possible.

"2. Purification of the sewerage system already existing, by replacing as rapidly as possible all damaged or defective drains.

"3. The introduction of new sewers in advance of other improvements in parts of the city not now supplied with drainage, and the extension of the system as far outside of the city limits as the rapidly growing population demands, so as to prevent soil contamination.

"4. The adoption of some system by which the lower sections of the city can be more completely drained and the risks arising from the backing up of tide water and sewage prevented.

"5. The final and safe disposal of the sewage.

"6. To make all existing privies, vaults, or other receptacles of human excreta water-tight and, by rigid inspection and penalties, to prevent the danger from leakage and overflow.

"7. The early completion of the plans recommended by Colonel Elliot, in charge of the Washington Aqueduct, and now in course of execution, which have in view the sedimentation of the Potomac water and ultimately the completion of works for filtration, the only proper method of purification.

"8. The suppression of all privies and the enforcing of the law to make sewer connections.

"9. Careful inspection of all dairies in the District from which our milk supply is drawn and the enactment of a law by which no milk shall be sold in the District without a permit from the health office. The inspection should cover an

examination at the dairies of all possible sources of infection, including the water supply."

Special stress was laid on the box-privy system and the shallow surface wells as being responsible for the majority of the cases of typhoid fever and diarrheal diseases.

Aid was given to this committee in its investigations by making a bacteriological examination of water from several wells and springs which were suspected of being infected. The result of the examination showed that the suspicions were well founded, and the majority of these wells were found to contain the intestinal bacteria.

The following is the memorandum furnished the committee, which explains itself:

Sample number.	Location of well.	Result of examination.	Condition of water.	Recommendations.
1	East side of 7th street between M and N streets NW.	Sewage bacteria; colon bacillus isolated.	Bad	Well should be closed.
2	L street between 6th and 7th NW.	.....do.....	.....do.....	Do.
3	East side 7th street between M and N.	.....do.....	.....do.....	Do.
4	10th and S streets NW.....	Sewage bacteria; fecal bacteria; colon bacillus isolated.	.....do.....	Do.
5	16th and Corcoran streets NW.	Ordinary forms usually found in water.	Good	Should be kept under observation. Do.
6	17th and K streets NW.....	Ordinary forms usually found in water, but in considerable quantities.	Suspicious	
7	10th street between B and C streets NE.	Sewage bacteria; colon bacillus isolated.	Bad	Should be closed.
8	3d street and Indiana avenue NW.	Sewage bacteria.....	.....do.....	Do.
9	T and 18th streets NW.....	Ordinary water bacteria, but in large numbers.	Suspicious	Should be kept under observation.
10	23d and G streets NW.....	Sewage bacteria.....	Bad	Should be closed. Do.
11	18th and S streets NW.....	Sewage bacteria in great numbers.	.....do.....	
12	K street between 21st and 22d streets NW.	Sewage bacteria; colon bacillus isolated.	.....do.....	Do.
13	9th and H streets NW.....	Ordinary water bacteria in small numbers.	Good	Should be kept under observation.

In view of the fact that deaths from malarial fevers are of rare occurrence in the cities of Philadelphia, Baltimore, and Norfolk—at least, this has been the experience of the officers of the Marine-Hospital Service stationed at these places—it is remarkable that Washington should prove the exception. It was suggested in this report that both the deaths from malarial fever and typhomalarial fever were nothing more or less than typhoid fever given another name. In the main, I believe that the conclusions were correct, and my own observation on cases of malarial and other fevers, made in a marine hospital (the majority of these having contracted the disease in the vicinity of Chesapeake Bay) was to the effect that deaths from malarial fevers were exceedingly rare and that the disease known as typhomalarial fever was equally rare. In over 400 cases examined I found 4 cases of a mixed infection of malaria and typhoid. Professor Osler reports that in 600 examinations of cases of fever none had been encountered, and that the so-called typhomalarial fever was nothing more than typhoid fever.

It then appears that all agree that these diseases are in all probability typhoid and should be so classified. Another significant fact is that these cases occur synchronously with typhoid and always in the same ratio. If, then, these cases are typhoid, we would have a considerable increase in the death rate per 10,000, and instead of the death rate of 7 for the ten years ending January 1, 1897, it would really be 7.6.

Washington City stands among the foremost in the high death rate in a preventable disease.

In 1895 another serious and widespread epidemic of typhoid fever occurred during the summer and fall, and the disease was so severe that a special sanitary inspector, Dr. George M. Kober, was appointed to investigate into its cause.

At the commencement of this inquiry a request came from the health officer for the bacteriological examination to be made of samples of water submitted by Dr. Kober, in the hygienic laboratory, which request was complied with.

From September 24 to December 13 about 200 analyses were made of samples of water from about 70 different sources, with the result of finding practically the same condition as existed in the wells examined the previous year. Dr. Kober concludes that the infected shallow surface wells located near leaky sewers and leaky privy vaults formed the ideal conditions for their infection and the dissemination of typhoid fever from them. Quite a number of these wells which were found to be badly contaminated were those which had been recommended to be closed and had been so for a time until, by one pretext or another, they were again reopened and used. Out of the 70 original sources (wells, springs, etc.), 26 were found to contain sewage bacteria, and in 21 intestinal bacteria were found.

In my report submitted December 24, 1895, I state that—

“The Potomac River water has been examined, as will be seen, at intervals during the inquiry.

“While the examinations on the whole make a better showing than do the same number of wells, it was not found free from contamination.

“On two occasions intestinal bacteria were isolated, and in several instances the sewage bacteria were found.”

The direct results of the investigation of both the medical society and Dr. Kober were the closing of many of the wells which were undoubtedly concerned in the spread of typhoid fever and diarrheal disease. This was particularly noticeable in localities where the people had depended solely on these wells for their supply. There was a noticeable diminution in the number of cases after a new supply of water had been introduced. Unfortunately, this did not cure the evil; typhoid fever, while diminished in these localities, had not disappeared, but still lingered. Not only this; the closure of the wells and the abatement of nuisances did not diminish, or has not materially diminished, the death rate of typhoid fever. The disease now appears to be widely scattered, and there are no particular foci, as have heretofore existed.

The previous investigations have not been without their indirect benefits. The Potomac water has been heretofore considered by many to be in as good condition as any other water supply, and the idea prevails that, on account of the large quantity of water and the proportionately small quantity of sewage thrown into the river, long before it reaches Washington it has been purified by the efficient agencies of aeration and sedimentation.

Other causes have been assigned for the prevalence of typhoid fever, such as milk, imperfect sewerage, and pollution of the subsoil.

While these theories offer a plausible explanation for these conditions, it by no means follows that they are true; but when people are misled into this way of thinking it takes a long time to convince them of the error—ten times longer than they were falling into it.

Such a mass of evidence had been collected that it was thought sufficient to convince almost anyone that the public water supply was contaminated, and would in time become more so, as the history of the Potomac River was the repetition of that of other rivers which are used for like purposes; and further, that no chemical or bacteriological examinations should be necessary to prove the condition. Such, however, is not the case.

In order to settle this question once and for time to come, another examination of the Potomac River water was commenced on July 1 last. These examinations

were intended to serve a double purpose—one to determine the biology of the Potomac water, and the other to serve as preliminary to a proposed investigation concerning the pollution of the water supplies, where the sanitary condition of one or more States was threatened or involved.

It was intended to collect the data of at least a year before publishing the final results, yet it is believed that the inquiry has been sufficiently far advanced to furnish conclusions of value.

This investigation has been assigned to my colleague, Passed Assistant Surgeon Spragne, who submits the following report:

HYGIENIC LABORATORY,

Washington, D. C., March 10, 1898.

SIR: I have the honor to submit for your consideration the following report of the bacteriological examination of Potomac River water from July 1, 1897, to February 28, 1898, inclusive:

In order that sufficient data might be obtained from which to draw reliable conclusions, it was determined to make semiweekly bacteriological analyses of our drinking water for a period of at least one year. Realizing the necessity of certain fixed factors in our work, upon which would depend the value of comparisons to be drawn, preparations were made to secure the desired uniformity. Accordingly, sufficient media was prepared in June, 1897, to last through the entire year. Using, as we have, for each examination, the same culture material for the bacteria, any sudden variation in the biological character of the water can in no instance be attributed to the employment of different media. There must also be a common source from which to obtain the water, and it should represent as nearly as possible the water which flows in our mains.

In the basement of the Marine Hospital Bureau building, in which the hygienic laboratory is located, is a tap which is kept constantly running in the operation of a vacuum apparatus, and from this source all of our samples have been collected. It is evident that these samples must very accurately represent the condition of Potomac water as it flows in the city pipes. The temperature has been taken with a centigrade thermometer, graduated to tenths of one degree, and a note made of the clearness or turbidity. The water was always collected in a sterile graduate, provided with a sterile paper cover, and thus conveyed to the laboratory. By means of a sterile pipette 5 cubic centimeters of the water was introduced into each of four fermentation tubes, two of which contained 1 per cent lactose-peptone bouillon, while the other two contained 1 per cent dextrose-peptone bouillon. The duplicate tubes were used for purposes of control as well as to furnish a broader basis upon which to conduct further research for the colon group of organisms and other sewage bacteria.

The fermentation tubes were then placed in a special incubator kept at a constant temperature of 39.5° C., and allowed to remain undisturbed for a period of forty-eight hours. At the same time 1 cubic centimeter of the water was introduced into a flask containing 99 cubic centimeters of freshly sterilized distilled water. The flask was then agitated sufficiently to make an even mixture, and 1 cubic centimeter was placed in each of six Petri dishes. Into the Petri dishes was then poured a tube of 2 per cent glycerine agar, which was thoroughly mixed with the 1 cubic centimeter of diluted Potomac water. Three of these plates were allowed to develop for forty-eight hours in the dark at room temperature, which varied from 25° C. to 30° C. The remaining three were placed in a Novy jar, and by repeated exhaustion of the air and by the introduction of hydrogen a pure atmosphere of the latter gas was obtained. These plates were then allowed to develop under the same conditions of temperature, darkness, and time as the first three.

At the expiration of forty-eight hours the colonies were counted and an average taken, which, multiplied by 100, gave the number of organisms in 1 cubic

centimeter of undiluted Potomac water. To those grown in the atmospheric air the name *aërobes* is given, and to those grown in hydrogen *anaërobes*. At the same time that the colonies were counted the fermentation tubes were examined and the amount of gas, if any, in the arm of the tube was recorded in inches. A hanging drop from each of the tubes was next examined for motile bacilli. If there was no fermentation and no motile organisms present, the tube was destroyed and no further examination made: but if motility, with or without fermentation, was present that tube was considered suspicious, and the examination of all such was continued for the purpose of detecting intestinal or sewage organisms. It may here be noted that the typhoid bacillus and the majority of the colon bacilli possess the power of moving more or less rapidly through a liquid medium in which they may be suspended. Hence the necessity of further study of any bacillus possessing that character.

In order to identify the sewage organisms it is necessary to separate them from the numerous harmless bacteria constantly present in water and from which they can not always be distinguished by their morphology. To secure this separation a small loop of the suspicious culture was transplanted into a specially prepared medium known as *Elsner's*, from the name of the bacteriologist who first made use of it. Without going into the precise method of preparation, it suffices to say that it is an iodized potato gelatine so standardized as to alkalinity that it corresponds exactly in its reaction to a chemically pure solution of calcium hydrate. This particular method of standardizing this medium is a modification of the method originally employed, suggested by Grimbart, and it has been found to give most excellent results. The peculiarity of this medium is that the growth of bacteria other than the bacillus of typhoid fever, the colon bacilli, and sewage organisms is either entirely inhibited or so limited that the intestinal and sewage bacteria, if present, are readily isolated.

In passing, it may not be amiss to state that very recently Professor Roux, of the Pasteur Institute of Paris, was heard to say that, in his opinion, *Elsner's* method was the best yet devised for isolating fecal bacteria. Every batch of *Elsner* prepared was tested with a pure culture of typhoid and colon to prove that they would grow thereon if present. Inasmuch as gelatine was the substance employed to produce solidity, it became necessary to keep the *Elsner* plates in a cool chamber, the temperature of which was kept at or below 20° C. The low temperature interfered to some extent with the rapidity of development of the bacteria, and for this reason the plates were retained for a period varying from five to seven days. No growth occurring at the end of that time, further investigation was abandoned; but in case of a growth appearing it was examined more fully for the purpose of ascertaining its character. If the growth was found to be a bacillus, it was at once transferred to several different media in order to learn its behavior and to enable it to be classified.

A bacillus obtained from a colony on an *Elsner* plate, after going through the stages previously described, was studied as to the following points: Did it possess motility? Did it ferment lactose and dextrose peptone bouillon? Did it produce indol after forty-eight hours' growth, at a temperature of 37° C., in Dunham's peptone solution? Did it liquefy gelatine? Did it acidify or coagulate litmus milk, and how long a time was required for any change in this medium? What was the nature of its growth on potato? How did it stain by Gram's method? According to the answers obtained to the foregoing questions was based our determination of the name of the bacillus. While, as can be seen from the above, every effort was made to find the typhoid bacillus, it must be acknowledged that up to the present time it has not been isolated from Potomac water; but the colon bacilli, which very closely resemble the typhoid, and are always found in connection with the last-named germ, were isolated on numerous occasions, as will presently be shown.

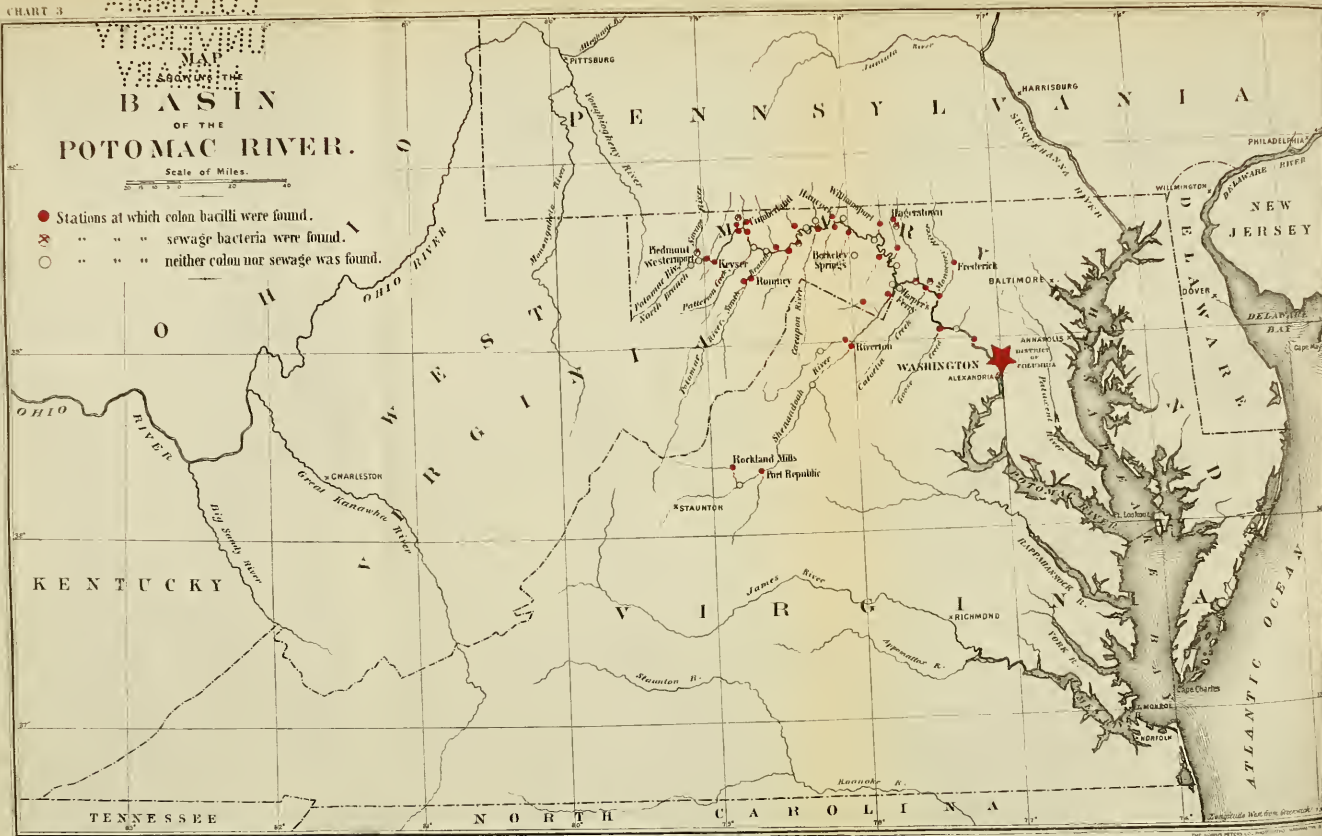
In addition to the 70 examinations of water taken directly from the tap, 55 samples

MAP SHOWING THE BASIN OF THE POTOMAC RIVER.

Scale of Miles.



- Stations at which colou bacilli were found.
- ⊗ " " " sewage bacteria were found.
- " " " neither colou nor sewage was found.



were furnished the hygienic laboratory by courtesy of the Geological Survey. They were taken at Westernport, on the north branch of the Potomac; at Romney, on the south branch; at Port Republic, on the Shenandoah, and at all the principal intervening towns down to Point of Rocks. It will thus be seen that the condition of the entire river and its tributaries was thoroughly investigated. These samples were collected under strict aseptic precautions, were promptly forwarded to the laboratory, and no unnecessary delay occurred in beginning the bacteriological analysis. It has been claimed by some investigators that a bacteriological analysis of water made some hours or days after its collection was worthless, because of the death of the organisms which would occur in the time of the interval between the time of collection and the beginning of the analysis.

For the reason that some slight changes, either by death or growth of the organisms, probably would occur in twenty-four or forty-eight hours, no count of the bacteria was made from these samples; but anyone familiar with the bacteriological analysis of water, observing the behavior of many of these samples, would have said that if time had destroyed any of the bacteria present in the fresh sample he would want ages to elapse before drinking the same. There were positive indications that some of the samples were literally teeming with bacteria; and the chart of the river showing the points at which the samples were collected and the points where the colon bacilli were found will show that in nearly every instance where sewage contamination could be expected it was present. For the reason above stated, the examination of these samples was limited to the search for sewage bacteria.

Reference to the accompanying chart, No. III, will show the places at which samples were collected marked with a circle, and those places at which the colon bacilli were found are marked with red. Briefly, colon bacilli were found in thirty instances and sewage bacteria were found in six others.

Number of bacteria found in Potomac water at each examination.

Date.	Aërobic bacteria found in 1 cubic centimeter.	Anaërobic bacteria in 1 cubic centimeter.	Date.	Aërobic bacteria found in 1 cubic centimeter.	Anaërobic bacteria in 1 cubic centimeter.
1897.			1897.		
July 1.....	650	Count not made.	Nov. 1.....	17	50
6.....	400	100	4.....	167	33
9.....	4,600	2,800	8.....	733	117
12.....	366	33	11.....	183	133
15.....	33	66	15.....	250	83
19.....	266	400	18.....	317	117
22.....	200	66	22.....	100	83
26.....	166	66	25.....	466	216
29.....	?150	?100	28.....	833	1,000
31.....	466	116	Dec. 2.....	2,267	1,200
Aug. 2.....	316	100	6.....	4,300	300
5.....	183	66	9.....	900	600
9.....	216	116	13.....	700	533
12.....	133	83	16.....	1,200	366
16.....	300	33	20.....	933	433
19.....	100	200	23.....	1,200	300
23.....	283	433	27.....	367	Count not made
26.....	250	66	30.....	283	Do.
30.....	166	300	1898.		
Sept. 2.....	366	133	Jan. 3.....	No growth.	67
6.....	116	116	6.....	533	100
9.....	2,200	1,200	10.....	567	167
13.....	150	200	13.....	500	200
16.....	50	500	17.....	566	66
23.....	150	16	20.....	467	233
27.....	150	100	24.....	700	400
30.....	200	0	27.....	733	167
Oct. 4.....	16	50	31.....	433	566
7.....	33	33	Feb. 3.....	400	400
11.....	116	83	7.....	633	66
14.....	83	50	10.....	167	87
18.....	216	100	14.....	166	200
21.....	83	50	17.....	333	33
25.....	33	50	21.....	333	66
28.....	167	50	24.....	1,133	166
			28.....	1,000	533

Percentage of times colon bacilli were found in Potomac water.

	Per cent of examination present.
1897.	
July	
August	30
September	33½
October	70
November	70
December	40
	20
1898.	
January	20
February	25

I will state that the data from which the temperature and turbidity curve (Chart No. II) were prepared were kindly furnished by Capt. D. D. Gaillard, Corps of Engineers, U. S. A., in charge of Washington Aqueduct. While the temperature and turbidity were recorded daily, for schematic purposes, averages were made for the two halves of each month, but it is thought that the deviation from the absolutely true curve is not sufficient to lead to erroneous conclusions.

The turbidity appears to correspond fairly accurately with the number of bacteria, and this is what would be expected, because increased muddiness can only come from a rain which washes in more organisms. While great stress has been laid by some upon the clearness of a water supply, and none will gainsay its desirability, it is a fact that when the Potomac water is clearest, as it was last year during September and October, then it was in reality the most dangerous to drink, because, as shown above, it contained relatively more pathogenic bacteria than when it was turbid. It is not far from the truth to say that the clearer the Potomac the more suspicious of it should we be.

Attention is called to the parallelism existing between the death rate from typhoid fever, the percentage of times colon was found, the fermentation, and the temperature curve; but at the same time that the above were high the number of organisms per cubic centimeter was low. That during the heated season the bacteria should be few is natural and easy of explanation. The anaërobic bacteria are at this time present in much greater numbers in proportion to the aërobic than at any other season of the year. Now, inasmuch as the anaërobic indicate with a fair degree of accuracy the amount of sewage contamination, it is evident that from August to November the Potomac River is more dangerously polluted than at any other season of the year. That there should be this relatively increased number of sewage organisms is equally as readily explained as that the total number of bacteria should be low. During the late summer and early autumn there is a low rainfall; consequently few organisms are washed into the river from the surface of the earth, the source of by far the greater part of the bacteria present in water.

During this season, however, the quantity of house sewage is appreciably above the yearly average, and it is from this source that the bacteria must come; hence we have a relative increase of dangerous bacteria and a diminution of the nonpathogenic varieties. At first glance it would appear that the highest typhoid death rate with the fewest organisms was contradictory, but when all the circumstances are taken into consideration it is at once seen that, so far from being a contradictory state of affairs, it is exactly what is to be expected. That the typhoid death rate, the presence of colon bacilli, the fermentation changes in the media, and the temperature should coincide with one another is perfectly logical, and

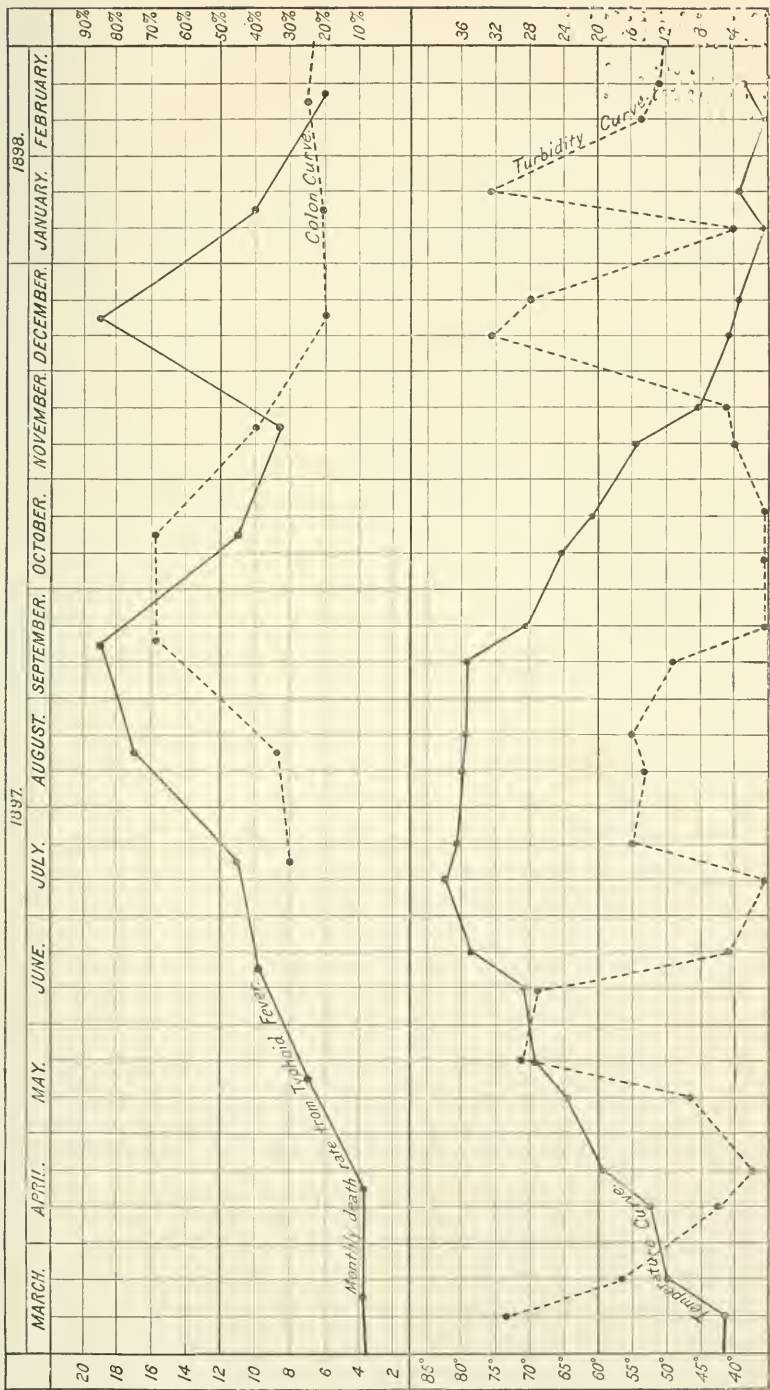


CHART II.

DIAGRAM SHOWING THE RELATION BETWEEN THE DEATH RATE FROM TYPHOID FEVER IN THE DISTRICT AND THE PERCENTAGE OF TIMES COLON BACILLI WERE FOUND IN POTOMAC WATER. TEMPERATURE AND TURBIDITY.

there is but one conclusion that can be drawn therefrom—the increased mortality from typhoid and diarrheal diseases is due to the increase in the quantity of bacteria from the intestines of man, which our citizens are compelled to ingest at that time. The causal relation between the impure drinking water and this death rate is so evident that to my mind it is almost a criminal negligence to allow such an easily preventable condition of affairs to longer obtain in our midst; and it can be truthfully said that just so long as the inhabitants of this District are compelled to use Potomac water in its present state of pollution, from 200 to 250 lives will be needlessly sacrificed annually.

Respectfully, yours,

E. K. SPRAGUE,

Passed Assistant Surgeon, Marine-Hospital Service.

P. A. Surg. J. J. KINYOUN,

Director Hygienic Laboratory,

United States Marine-Hospital Service, Washington, D. C.

APPENDIX.

Places and dates at which samples were collected by representatives of the United States Geological Survey, with the results of examination.

Places.	Date.	Bacteria.
Sideling Creek, 1 mile above its mouth.....	1897. Sept. 26	Colon bacilli.
Fifteen-Mile Creek, 300 yards above Chesapeake and Ohio Canal crossing.....	July 26	
Town Creek, 200 yards above Chesapeake and Ohio Canal crossing....	Sept. 25	Do.
Eavitts Creek, 300 yards above Baltimore and Ohio Railroad crossing.....	do	Do.
Georges Creek, Washington street, Westernport.....	Sept. 27	
Do.....	do	
Savage River, Piedmont Water Works intake.....	do	Sewage bac- teria.
Potomac River, 150 yards above junction with Savage River.....	do	
Potomac River, at bridge below Piedmont pulp mill.....	Sept. 28	Colon bacilli.
Pattersons Creek, near mouth.....	Sept. 29	Do.
Big Run, South Branch Potomac, mile below Romney.....	Sept. 27	Do.
South Branch Potomac, above mouth of Big Run.....	do	Do.
New Creek, 200 yards above confluence North Branch Potomac.....	Sept. 29	Do.
Wills Creek, above glass works, three-fourths mile above Cumberland.....	Sept. 28	Do.
Little Capapon Creek, one-half mile above mouth.....	Sept. 29	Do.
Great Capapon River, one-half mile above Baltimore and Ohio Railroad bridge, Great Capapon Station, W. Va.....	do	Do.
Drain, United States Leather Company Tannery, Pawpaw, W. Va.....	do	Sewage bac- teria.
Sleepy Creek, near Baltimore and Ohio bridge, 1 mile above Sleepy Creek Station.....	Oct. 1	Colon bacilli.
Discharge from Berkeley Springs sewage pool into Warm Spring River, West Virginia.....	Sept. 30	Do.
Warm Spring Run, below Baltimore and Ohio station, Hancock, W. Va.....	do	Do.
Tonoloway Creek, 1 mile below Hancock, W. Va.....	Oct. 1	
North Fork of Shenandoah River, Riverton, W. Va., 1 mile above confluence.....	Oct. 3	Do.
Conococheague Creek, Williamsport, Md.....	Oct. 2	Do.
Licking Creek, near mouth, 8 miles below Hancock.....	Oct. 1	Do.
South Fork Shenandoah, Riverton, W. Va.....	Oct. 3	Do.
Back Creek, 3 miles above North Mountain, West Virginia.....	Oct. 7	Do.
Big Spring River, mouth.....	do	Sewage bac- teria.
Little Conococheague Creek, near mouth, Maryland.....	do	Colon bacilli.
Opequon Creek, West Virginia, near mouth into Potomac River.....	do	
South end drain, Hagerstown, Md., where it enters Marsh Run.....	Oct. 9	Sewage bac- teria.
Town drain, where it enters Marsh Run, Hagerstown, Md.....	do	Do.
Little Tonoloway, Hancock, Md.....	Oct. 11	Colon bacilli.
Cedar Creek, three-fourths mile above confluence with North Fork Shenandoah.....	Oct. 12	
Antietam Creek, near mouth.....	do	Do.
Carroll Creek, near mouth into Monocacy, drainage of Frederick, Md.....	Oct. 14	Do.
Potomac River, Point of Rocks.....	do	Do.
Seneca Creek, 1 mile above mouth.....	Oct. 15	Do.
Goose Creek, 1 mile above mouth.....	Oct. 14	Do.
Catoctin Creek, Maryland.....	do	Do.

Places and dates at which samples were collected, etc.—Continued.

Places.	Date.	Bacteria.
Catoctin Creek, Virginia, one-half mile from mouth.....	1897. Oct. 14	Sewage bac- teria.
Monocacy Creek, Maryland, one-fourth mile from mouth.....	do.	
Chesapeake and Ohio Canal, at Great Falls.....	Oct. 15	
Shenandoah River, at junction with Potomac, Harpers Ferry side.....	Oct. 25	
Shenandoah River, at junction Potomac, opposite Harpers Ferry.....	Oct. 25	
Wills Creek, under Baltimore Street Bridge, Cumberland, Md.....	Oct. 25	Colon bacilli.
Wills Creek, above glass works, Cumberland, Md.....	do.	Sewage bac- teria.
Potomac water, above Johnston Street Bridge, Cumberland, Md.....	do.	Colon bacilli.
Chesapeake and Ohio Canal, five-eighths mile below Cumberland, Md.....	do.	
Hawkesbill Creek, one-half mile above mouth, Page County, Va.....	Oct. 27	Do.
Savage River, one-half mile above junction with North Branch Potomac.....	do.	Do.
Potomac River, one-eighth mile above junction with Savage River.....	do.	Do.
Flowing Run, Millville, W. Va., near mouth, polluted by straw.....	Oct. 25	
Middle River, south fork of Shenandoah, Mount Meriden, Va.....	Nov. 9	
South River, south fork of Shenandoah, mouth, near Port Republic, Va.....	Nov. 7	
North River, south fork Shenandoah, Rockland Mills, near Weyer Cave, Va.....	Nov. 8	

The latter inquiry was more particularly directed to the detection and isolation of two groups of bacteria—the colon and sewage groups—than to the general biology of the Potomac River water, because of the relation that these bacteria bear to disease.

The colon bacillus taken in connection with others of this group has been regarded as an index of water pollution, and while these are not considered as the specific causes of disease, they are always found associated with those that are. So far as known, the typhoid bacillus has been isolated only twice from drinking water, notwithstanding the fact that this one bacillus has been sought for more than all others combined. Various explanations have been given as to why this bacillus can not be detected and isolated, even from water which is positively known to contain it; yet none are fully satisfactory. The most plausible theory is that the other bacteria are so numerous as to obscure it. This seems to be the case in isolating the typhoid bacillus from dejecta. The colon bacilli and other intestinal bacteria are so numerous that the typhoid bacillus is recognized with great difficulty. If this, then, be the case, one can readily imagine the difficulties in the way of success in isolating the typhoid bacillus from water where the sewage is greatly diluted and the bacterial flora is so varied and numerous. Dr. Dunham has shown that many of the bacteria found in sewage possess the power of living and multiplying in an atmosphere devoid of oxygen; also that this method is very valuable in detecting sewage contamination when it would be extremely difficult to do so by other means. Dr. Sprague has employed this method in his investigations and found it highly satisfactory. This method is valuable in detecting the presence of sewage in infinitesimal quantities, and is far more delicate than chemical methods. Of course, the detection of the biological factors in sewage is meant, and not chemical compounds.

Chart No. I of Dr. Sprague's report shows the relative quantity of sewage pollution found. Dr. Theobald Smith was first to make a quantitative determination of the bacteria in the Potomac water. The results of his inquiry may be seen in the accompanying chart No. B. By comparing this chart with the one submitted by Dr. Sprague it will be seen that there is a considerable variance in the results. Especially is it so with reference to the relation the number of bacteria bear to the presence of typhoid fever. This difference is thought to be due to the changed conditions which have taken place within the past twelve years. My own observations during the past four years more nearly coincide with those of Dr. Sprague than with those of Dr. Smith.

The most striking feature is the number of times the colon bacillus was detected

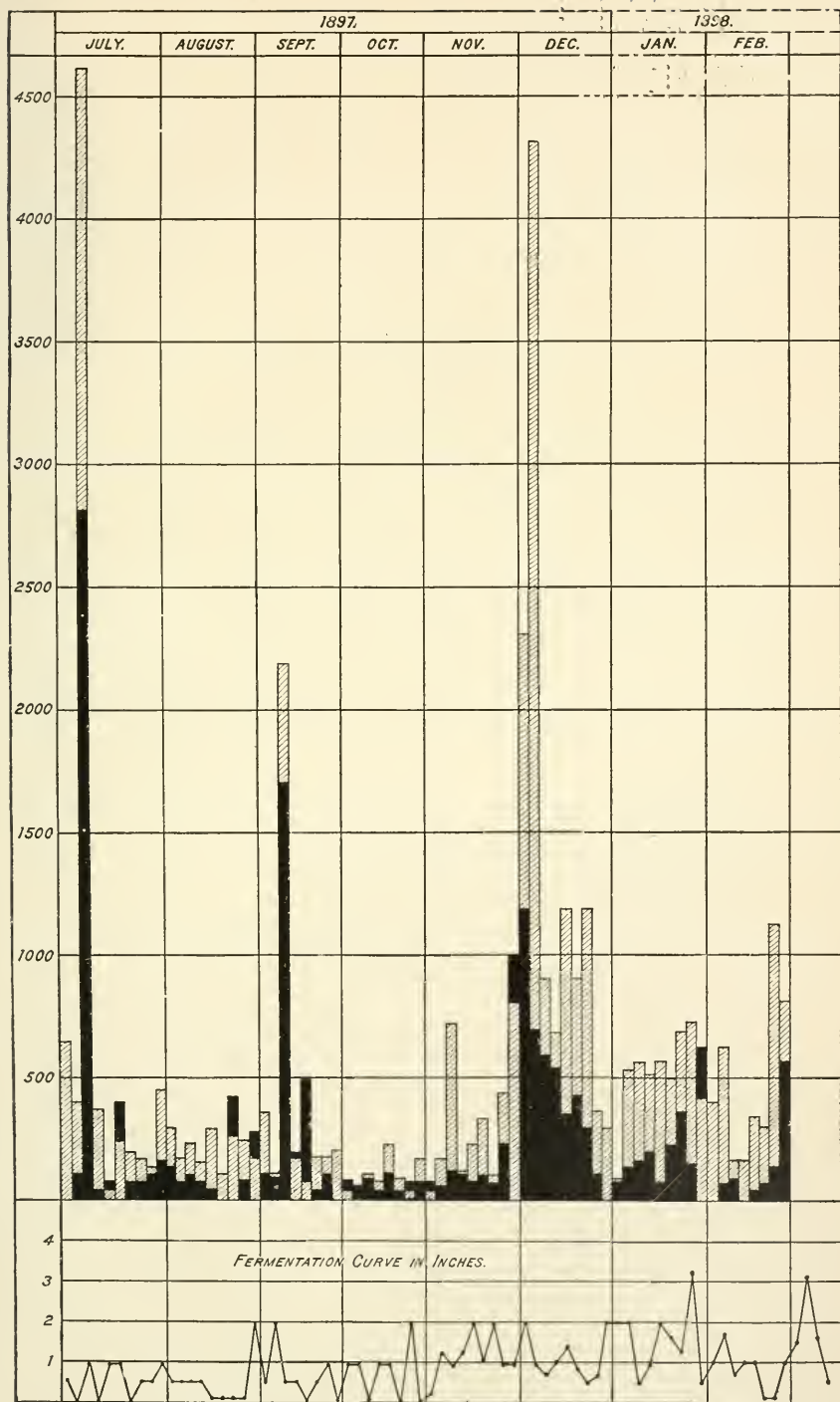


CHART I.

DIAGRAM SHOWING THE SEMI-WEEKLY VARIATION IN THE NUMBER OF BACTERIA IN ONE CUBIC CENTIMETER OF POTOMAC WATER. SHADED, AÉROBES. BLACK, ANAÉROBES.

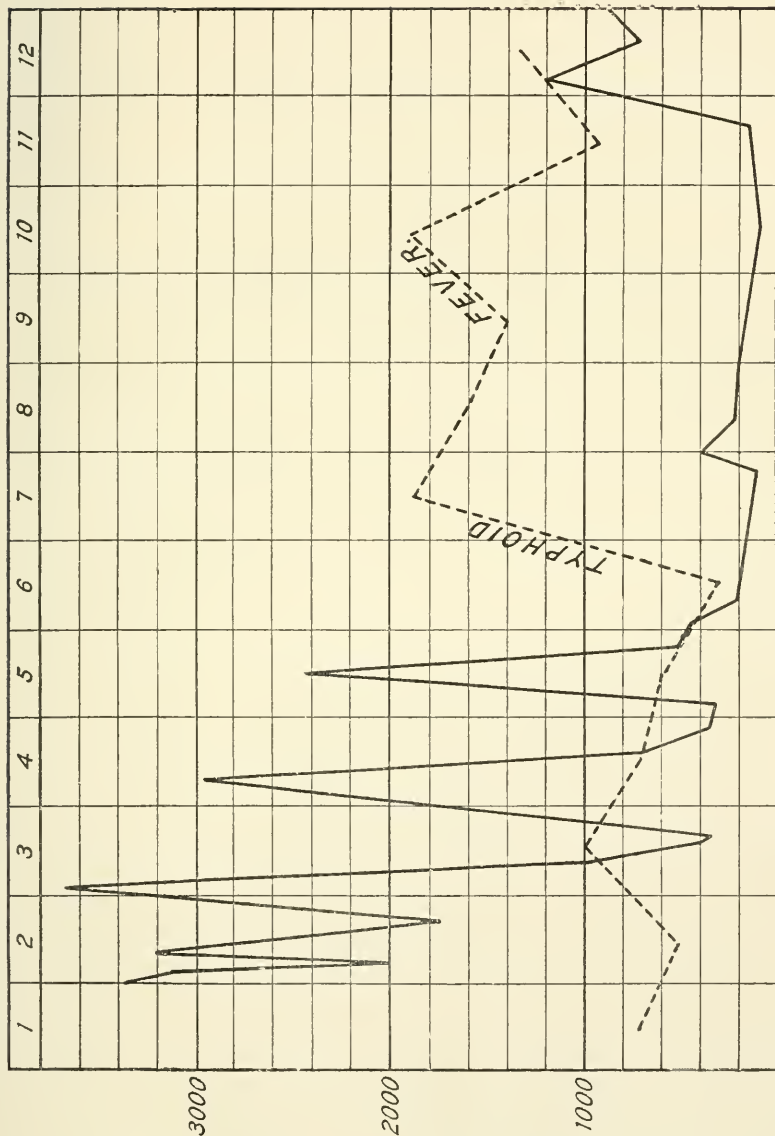


CHART B.

CHART SHOWING COMPARATIVE NUMBER OF BACTERIA FOUND IN ONE CUBIC CENTIMETER OF POTOMAC WATER IN 1886. ALSO DEATH RATE OF TYPHOID FEVER IN 1886.

By Dr. Theobald Smith.

and the relation it bears to the monthly death rate of typhoid fever. It is an established fact that during the summer time the number of bacteria is diminished by certain agencies which will be spoken of later. It has been found that there is a relative increase in the number of intestinal and sewage bacteria during this time. This fact alone, it is believed, will go far in establishing the connection between typhoid fever and this group of bacteria.

There is a wide difference of opinion concerning the viability of bacteria in water. Some claim that they will not develop in water unless it is very rich in nutrient material, and then only under the most favorable conditions, while there are others who cite instances where the bacteria material increases under the ordinary conditions, especially those of the intestinal group.

It is also a well-recognized fact that temperature plays an important rôle in the development of bacteria, and we would expect a large increase in their number during the summer and fall. Practically this does not occur.

Water containing sewage will preserve bacteria for a considerable length of time, especially if the temperature is low. The bacteria in water may be diminished by the germicidal action of strong sunlight, especially if the water is clear and still; yet under the most favorable conditions the sunlight affects only the under stratum, and has scarcely any effect upon those a foot or so below the surface.

There is little or no effect if the water is turbid or moving rapidly.

It requires a long time for bacteria to be affected by aeration. They will diminish under its influence if it is persistent, but not otherwise. The inference drawn from the oxidation of the bacterial and chemical products does not apply to the bacteria. The number of bacteria in the Niagara River are but slightly diminished in their plunge over the falls and subsequent aeration in the stream below. Perhaps the stream is not long enough to test this thoroughly, but I am of the opinion that there are no rivers in this country of sufficient length to accomplish this purpose.

There is no doubt but that sedimentation accomplishes considerable in diminishing the number of bacteria. Sedimentation of bacteria is quite another thing from the deposition of suspended matter. A stream may free itself from turbidity and yet contain a large number of bacteria. Sedimentation of bacteria may, and often does, occur as the result of time and the distance the water is carried. The slower the volume of water is moved the more rapid will be the deposition. It remains to be demonstrated whether any sedimentation occurs in the Potomac River above Washington. If we take the turbidity as an index the sedimentation must be slight. So far the number of observations have not been sufficient to settle this question.

A series of observations were recently made of the water in the receiving reservoir, which is located a short distance above the city. These observations were to determine the number of bacteria at different depths in the reservoir. The following are the results:

Station.	Location.	Sample.	Bacteria to 1 cubic centimeter.
Station 1.....	Southwest corner of Reservoir 1.	1. Water from surface..... 2. At 1½ meters..... 3. Within 1 foot of bottom, at 3½ meters.	2,800 1,670 330
Station 2.....	At influent gate, Reservoir No. 1	1. Water from surface..... 2. At 2 meters depth..... 3. At bottom, 3½ meters.	330 267 193
Station 3.....	At central gatehouse.....	1. Water from surface..... 2. From bottom, 3½ meters.	1,067 633
Station 4.....	Southwest corner of Reservoir No. 2.	1. One foot below surface..... 2. At bottom, 3½ meters.	1,200 567
Station 5.....	Effluent gate, Reservoir No. 2.	1. One foot below surface..... 2. At bottom, 3½ meters.	690 833

It was contrary to expectation to find the number of bacteria greater on the surface than at points below. This is explained by the rapid current of the water passing from one reservoir into the other and out at the gate, thereby practically making a stream through the reservoir. The water evidently flows in the line of least resistance, and this is found at the surface. Consequently, the bulk of water passes through the reservoir in a surface current and allows the under stratum to deposit its bacteria. It also points to the fact that sedimentation does occur, but to a slight degree, especially so in those localities where the current is slackened or absent. It is not believed that the short time of three days would be sufficient to influence materially the number of bacteria.

I am informed that the reservoir contains 150,850,000 gallons, which is a three days' supply for the city.

Observations which were conducted with the London water supply during 1896 show that it requires at least ten days' storage before sedimentation diminishes the number of bacteria, and if the water was allowed to remain in storage for a month or more the sedimentation was more complete.

The same conditions will apply to the public water supply. I am unable to state whether the Delecarlia and receiving reservoirs are of sufficient size to permit the storage of water for this length of time.

There is an intimate relation existing between the number of bacteria present in a water supply and disease. Rivers or other sources of water supply which contain a large number of bacteria are responsible for the large number of diarrheal disorders. So if the number of bacteria is high and constant a water should always be looked upon with suspicion. A sudden rise in the number of bacteria in the Potomac water may not be of great importance, but the persistence of this large number is always to be regarded with suspicion. It is to be expected that a water supply receiving large quantities of decomposing organic matter—sewage, in other words—has associated with it a great number of bacteria. There is always a relative increase in the number of bacteria in river water during winter. This is due to two causes: First, increased washings from the soil; and second, the preservative action of low temperatures.

It will be observed that during these months the typhoid-fever death rate is at its minimum, notwithstanding the increased number of micro-organisms. At first sight one might conclude that this would be a contradiction of the foregoing statement. The increase in the number of bacteria is synchronous with the increased volume, notably just after rains or during the winter months, when the precipitation is the heaviest. It would be natural to infer that if the number of bacteria were indicative of contamination there should be an increase in the number of diarrheal diseases. Yet this is not the rule. There are, however, exceptions. During the summer months there is an occasional heavy rain, which carries the sewage from the watershed to the river, and this rain is not sufficient to materially augment the body of water in the river. In this way it is probable that large quantities of concentrated sewage may suddenly be thrown into the water and do great harm. In the summer time the stream and tributaries receive a given quantity of sewage daily, the water becoming less in volume, thereby increasing the number of sewage bacteria many times over the number that are found in winter.

While there is a relative increase in the number of bacteria during the winter months, there is also an increase in the volume of water, thereby dissipating in a measure the danger. This, I believe, is the explanation of why there is an increase in the number of cases of typhoid fever in the summer time over those of the winter. Now, if the river water would purify itself by means of aeration, light, and sedimentation, it should occur through the summer months, when the conditions are most favorable. We would expect a gradual diminution of sewage and colon groups of bacteria, and especially those contained in the Potomac River.

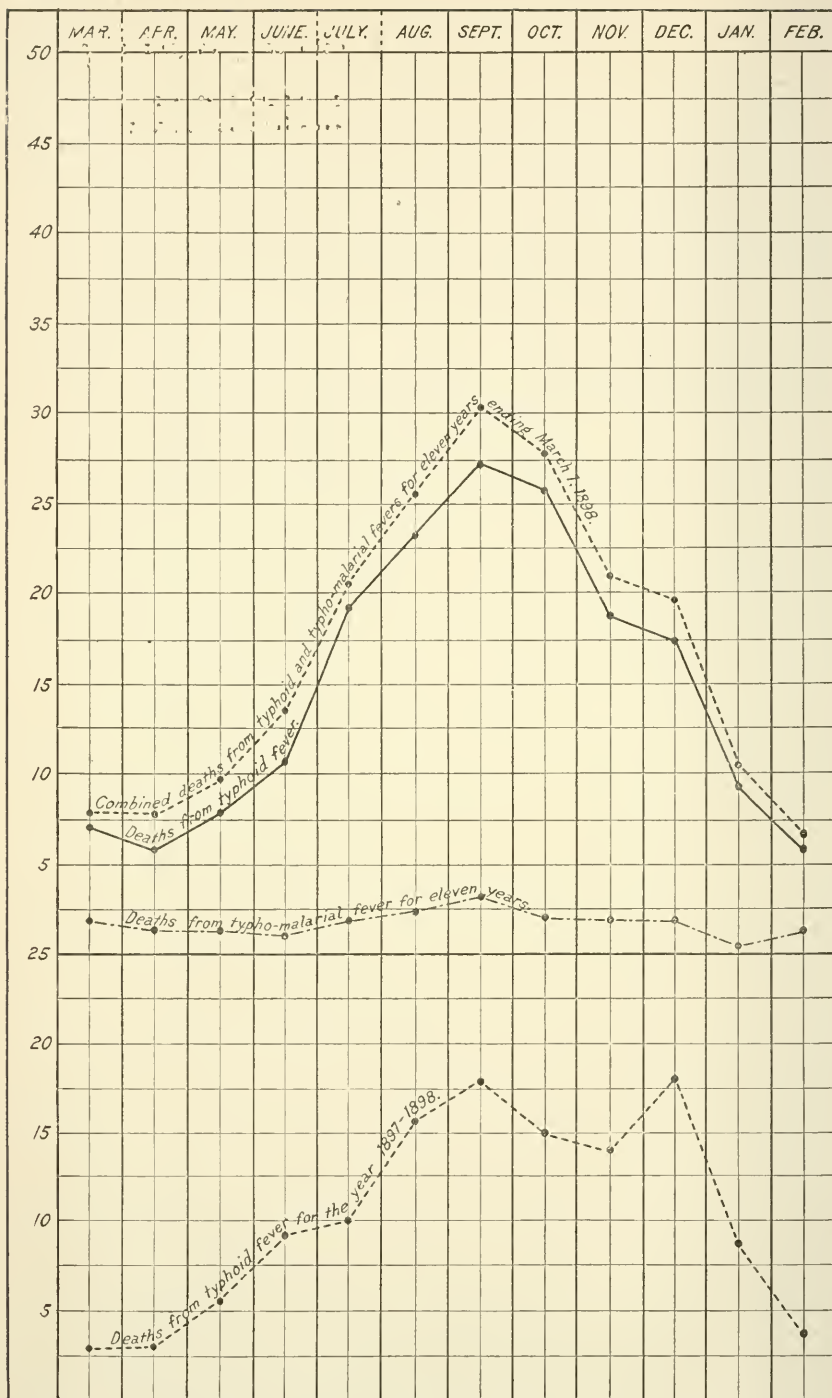


CHART A.

The larger proportion of contamination of Potomac River occurs at and above Cumberland, Md. The tributary streams below this point do not add much to the contamination.

Mr. Newell, of the Geological Survey, states in his report that if we could dam off the stream below Cumberland, the greater part of the pollution would be removed. Now, if the river would purify itself by aeration and sedimentation, it would be natural to suppose that the pollution would become less and less as we approach Washington. On the contrary, Dr. Sprague reports that the samples of water taken at various places in the Potomac Basin do not show a diminution of the colon group, but a relative increase as we approach Washington. This fact alone would appear to be sufficient to demonstrate the fallacy of self-purification of a stream. There is evidently more than a coincidence between the presence of the colon group of bacteria and the number of cases of typhoid fever. Chart A has been prepared to show this relation.

By reference to this chart it will be seen that the upper line represents the total death rate, by months, from typhoid and typhomalarial fevers for the eleven years ending March 1, 1898. The second line represents the number of deaths from typhoid fever during this period, and the lower line the number of deaths from typhoid fever in the year 1897-98, ending March 1. There is no doubt that the deaths reported as typhomalarial are nothing more or less than typhoid, as the increase of deaths from this disease is synchronous with those of typhoid. By comparing these mortality curves with those prepared by Dr. Sprague in chart No. 1, it will be seen that there is a coincidence between these and the curve of the intestinal bacteria. The same relation between this group of bacteria and the prevalence of typhoid fever has been shown in cities other than Washington, as, for instance, Hamburg. Typhoid fever was endemic, prevailing in epidemic form in the summer and fall months. The bacteriological analysis of the drinking water demonstrated that the increased number of intestinal bacteria always coincided with the increased prevalence of typhoid fever and diarrheal diseases. This condition prevailed year after year until the water was filtered. Since then there have been no such coincidences.

We have still more evidences of the pollution of the Potomac River. Dr. Kober reports that in 1890 an epidemic of typhoid fever occurred in Cumberland, Md., and three weeks later there was an increase in the number of cases in Washington. If we allow from three to five days for a given volume of water to travel from Cumberland, Md., to Washington, and from fourteen to eighteen days for the period of incubation from typhoid fever, it would coincide with the increase in the number of cases.

The principal causes of pollution from sewage are derived from the towns and villages located in the Potomac Basin. There are about 35 of these located on the Potomac and its tributaries, which have in the aggregate a population of about 75,000, and are distributed as follows:

Name.	Popula- tion.	Name.	Popula- tion.
Petersburg, W. Va.	400	Piedmont	2,000
Moorefield, W. Va.	500	Keyser	3,500
Romney	900	Luke	1,000
Pawpaw	200	Lonaconing	4,200
Berkeley Springs	1,000	Frostburg	6,000
Martinsburg, W. Va.	500	Charlestown	2,500
Williamsport	1,500	Front Royal	1,800
Hagerstown	15,000	Riverton	400
Frederick	10,000	Berryville	1,500
Cumberland	15,000	Millville	400
Dobbin	600	Toms Creek	300
Hamilton	600	Harrisonburg	3,500
Gormanias	600	Staunton	7,000
Elk Garden	1,800	Harpers Ferry	1,000
Westernport	2,000		

Typhoid fever has been reported to prevail in Cumberland, Staunton, Harpers Ferry, Elk Garden, Westernport, Frederick, and Hagerstown.

The conclusion to be drawn from the above statements is that the Potomac is polluted with sewage to such an extent that it is a constant menace to the health of the inhabitants of the District of Columbia. This is not a new statement, but is made only to emphasize what is already well known.

REMEDY.

Several ways may be considered for purifying the water:

First. The control of the watershed.

Second. Seeking a new supply.

Third. Improvement of the present supply.

According to the report of the hydrographer of the Geological Survey, the drainage basin of the Potomac River has an area of over 11,000 square miles, which lies in four States—Pennsylvania, Maryland, West Virginia, and Virginia. It would be next to impossible to control this vast area or abate the nuisances thereon without practically depopulating it. It need not be considered further.

A new supply must either be taken from a watershed capable of yielding an adequate quantity of water, or obtain it from artesian wells. There is no watershed near Washington which would furnish the water supply which is not open to the same objections as apply to the Potomac Basin. Even if it were possible to procure a new supply, the expense of purchase and that incident to policing would be far in excess of the expense connected with any proposition heretofore advanced for the purification of the present water supply. Artesian wells would not, owing to the geological formation of the District, be practicable.

Filtration.—Filtration of water is accomplished in one of two ways, the rapid method of mechanical processes, or by the slow method of sand filtration.

The mechanical method, while it removes the suspended matter from a water, performs the function of removing bacteria in a variable manner, depending on the character of the appliance, the method of operating, and the water to be filtered. The removal of the bacteria is what should be defined as filtration, and a filter which removes the bacteria successfully will remove the suspended matter; but filters may remove the suspended matters and fail to reduce the number of bacteria. This is usually what the mechanical filters do. Mechanical filtration would not be successful in removing the bacteria from the Potomac water on account of the large quantity of suspended matter.

Household filtration has its advocates. The filtering apparatus best adapted for household purposes are those made of unglazed porcelain or infusorial earth, such as the Pasteur-Chamberland or the Berkfeld. These filters, if perfect (and very few of them are), will efficiently filter water for a short time only. They require a great deal of care and attention, and must be cleansed at frequent intervals, for if not, they become a greater menace than the raw water. They are also quite expensive and out of reach of the masses, those who require them most. You may enjoin and plead for people to boil their drinking water, but they will not do it unless threatened with a visitation of cholera, and then only at starts and intervals, it being proportional to the degree of their fright. My opinion is that if you desire people to use boiled water you must boil it for them.

Sand filtration is the most practical solution; in fact, it seems to be the only way in which a large quantity of water can be purified and rendered potable.

It was on account of the high death rate from typhoid fever that this system of water filtration was adopted and perfected by the European cities. Since its use the death rate from typhoid and other diseases has fallen to a very low rate. In view of the good results accomplished by their use of it, it is remarkable that no more than four of our American cities have adopted this system, and particularly Washington.

It is hardly within the province of this report to deal with the construction and method of operating sand filter beds, as this is for engineers to consider.

The description of these filter beds has been promulgated now for several years, and is common property. Anyone can inform himself of the details of construction and operation if he care to manifest a sufficient interest. A proposition has been advocated to send a commission to Europe to study this system of water purification, and to report on its adaptability for the water supply of Washington. While such a commission may by personal inspection gather facts concerning the best method of constructing and operating European filters, little that is new will be added to our present knowledge.

Three cities of the United States have already followed the example of Lawrence, Mass., and have filter beds in successful operation. All these cities are within twelve hours' travel of Washington.

I can not agree that the situation is not serious, or that it can admit of further delay by reason of the fact that the death rate from water-borne diseases has shown no material increase within the past three or four years. The best that can be said is, it is bad: we have a remedy, and the sooner it is applied the more lives will be saved—lives which are being sacrificed by delays or negligence which should be characterized by no less a term than criminal.

During the past eleven years ending March 1, 1898, there have been 2,150 deaths reported from typhoid and typhomalarial fevers, not including those from diarrheal diseases, of which at least one-half are directly due to polluted water. If during this time a purer water supply could have been furnished, it is believed that the death rate from typhoid fever alone would have been diminished 80 per cent, a saving of 1,720 lives, and the prevention of over 16,000 cases, not to mention the expense incidental to sickness.

It is considered a crime to buy and sell human beings, yet there are worse crimes being enacted here in Washington. There are persons who have deliberately prevented the establishment of hospitals for the care and treatment of the poor little unfortunates, and have made it impossible so far by creating a sentiment against providing a filter plant unless the sewer system be extended and improved.

No one will attempt to deny the necessity of an adequate sewer system, but more good will come from purifying the water supply than from the renewal of the present sewers or their extensions, especially to outlying farm lands.

Munich, celebrated for its former high death rate from water-borne diseases, had no house sewer system until two years ago. Neither had Paris (now constructing). Notwithstanding this, the death rate was far below the cities which use raw river water. In Baltimore, Md., which still clings to her cesspools and surface drains, the water is reasonably pure, and the death rate is far below Washington.

The construction of a filter plant for Washington appears to be easier than for most cities. The Government already owns the land, and has already constructed the reservoirs and basins, one of which could be readily changed and converted into filter beds.

The Delecarlia or the distributing reservoir could be converted into a filter, perhaps the latter, and the water could be allowed to sediment in the Delecarlia before it is filtered. This might be an advantage at times when the water is very muddy.

It is further suggested that a small filter bed—say 100 feet square—be erected in a corner of the reservoir for experimental purposes, in order to determine synchronously with the construction of the filter beds the best material for filtration, as well as the rate of flow, etc. In this way the question could be settled without delay. When the filter beds are ready to receive the filtering material sufficient data would be gathered to determine the best plan of construction and operation.

A part of the receiving reservoir could be used, as now, for storing a supply.

It would seem to be an easy matter to enlarge the filter beds from time to time by utilizing the land just to the north and south of the receiving reservoirs, and in this way be able to furnish all the water required.

Respectfully submitted.

J. J. KINYOUN,

Passed Assistant Surgeon, Marine-Hospital Service, Director.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

The inquiry was continued until August 1, 1898, to complete the year, and the additional data collected only went to confirm the conclusions already drawn.

This investigation was intended to be preliminary to the general subject of the pollution of public water supplies, where the interest of one or more States are involved, which it is hoped the Service will be able to undertake at as early a date as possible.

LABORATORY INSTRUCTION TO OFFICERS OF THE SERVICE.

The usual course of instruction in clinical microscopy and sanitary chemistry was begun on January 4 and continued until May 1. Two officers of the Service availed themselves of this course. The time of the year when it is practicable to give this course precludes the study of the malarial organism except by prepared specimens. This is quite unsatisfactory. Some arrangement should be perfected by which this instruction could be given, as it is highly important that this subject should be well understood by the officers of the Service.

The revised regulations permit the officers of the Service to receive laboratory instruction from time to time as their services can be spared. Some further provision should be made by which the laboratory should be open to officers and others for special research work. The laboratory is now so well equipped in instruments and apparatus that exceptional facilities can be offered for this work.

CAR SANITATION.

The subject of car sanitation is still under investigation. It has been now nearly two years since it was begun. It has proven a far more difficult task than was first supposed, so many obstacles have from time to time arisen which have caused repeated delays in obtaining satisfactory data regarding the sanitary conditions existing in the railway coach. So far the results of the investigation are more satisfactory than was at first thought possible. They all point to there being not so much danger to the public health from the railway coach as was at first supposed. It is expected to finish this work within two or three months.

The experiments undertaken at the same time to demonstrate the best methods of disinfecting railway coaches have been brought to a successful termination, and as a result of this, cars are now being

disinfected at little cost and without injury—quite a contrast to former methods.

MEASURES TO OBTAIN MATERIAL FOR PATHOLOGICAL INSTRUCTION.

In view of the fact that considerable difficulty has arisen from time to time in providing sufficient pathological material for instruction and study, it became necessary to draw upon the marine hospitals for this material, and accordingly, upon my representation to the Bureau of the necessity, the following circular was issued:

[Circular.]

JUNE 28, 1898.

Medical Officer in Command, United States Marine-Hospital Service:

In addition to Bureau circular of June 30, 1896, requiring post-mortem examinations to be made in all cases possible, etc., you are further directed to send to the Hygienic Laboratory, Washington, D. C., specimens from the several organs and pathological processes of each case upon which a post-mortem examination has been made. The specimens should not be larger than 2 to 3 centimeters square, and should be prepared after the following methods:

Two sets of specimens should be prepared, one set to be placed in 50 per cent alcohol for two weeks, and then placed over in 95 per cent alcohol for a week or ten days. The other to be placed in Müller's fluid (bichromate of potash, 1 part; sodium sulphate, 2 parts; water, 100 parts) for three days, and then changed to fresh fluid and allowed to remain a week. The specimens should then be washed for several hours and then placed in 95 per cent alcohol for a week or more.

The specimens are best labeled by wrapping each in paper, using a lead pencil for labeling.

In preparing the specimens for the laboratory a special mailing case will be sent you.

After the specimens are placed in the glass jar a quantity of absorbent cotton should be placed around the specimens sufficient to maintain them in place, after which a small quantity of 95 per cent alcohol should be poured over the cotton—just sufficient to keep them moist. A label should be affixed to the jar containing the specimens, giving the name of hospital, name of patient, permit number, and date of death.

You will acknowledge receipt of this circular.

WALTER WYMAN,
Supervising Surgeon-General, M. H. S.

It is anticipated that within a short time the laboratory will be amply supplied.

It is proposed that these pathological specimens be examined, classified, and catalogued as soon as received, and in this way to gradually build up different series of pathological specimens in which can be shown the severe disease processes.

MICROSCOPICAL AND CHEMICAL EXAMINATIONS.

Microscopical examinations have been made of nine specimens, as well as employing the Widal test eighteen times for suspected typhoid fever.

Independently of the above, chemical and bacteriological examinations have been made by direction for the purveying division, as well as for the Treasury Department and for boards of health.

PROSPECTUS OF LABORATORY WORK DURING 1899.

With your approval the following investigations will be instituted during the ensuing year:

1. A study of the bacillus tuberculosis and the allied species, for the purpose of determining the relations they bear one to another.
2. The investigation into the cause, nature, and treatment of the fevers incident to the southern part of the United States. Coincident with the studies on tuberculosis, I would recommend that the study of leprosy in the United States be also included.

RECOMMENDATIONS.

My previous recommendations regarding the removal of the laboratory from the Bureau building and providing suitable buildings properly located and equipped for scientific research are again respectfully urged.

On account of the great increase of the work now devolving upon the laboratory I would recommend (1) that an additional officer be assigned for duty; (2) that the working force should be increased by an additional attendant; (3) that a clerk who is proficient in stenography, typewriting, and translating French, German, and Italian should be also assigned.

Respectfully submitted.

J. J. KINYOUN,

Passed Assistant Surgeon

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

REPORT ON BEST METHOD OF DISINFECTING MAIL MATTER.

HYGIENIC LABORATORY,
UNITED STATES MARINE-HOSPITAL SERVICE,
Washington, D. C., March 3, 1898.

SIR: I have the honor to acknowledge your reference of March 1, 1898, requesting a report on the best methods of disinfecting the mails, and in accordance therewith would state that the most convenient and practicable method for disinfecting letter mail is with formaldehyde gas, applied in one of the following ways:

First. By placing the letters in a closed receptacle, such as a wooden box provided with a tight-fitting lid, and sprinkle over the letters formalin or formol, which are commercial articles of a 40 per cent solution of formaldehyde. The receptacle should then remain closed for three or four hours, it depending upon the amount of mail matter to be disinfected; the greater the quantity the longer should be the exposure.

Second. By using a mixture of formalin or formol and sawdust—one part of the former to two parts of the latter. The sawdust can then be used in the same man-

ner as the formaldehyde. The exposure, however, should be somewhat longer, say, six hours.

Third. By the generating of formaldehyde gas from wood alcohol by means of special lamps. The lamps employed for this purpose should be capable of transforming not less than 1 liter of wood alcohol per hour. The disinfection of letters, etc., by this method is more applicable to large quantities where the exposure can be made in a room, using not less than 600 grams (750 cubic centimeters: $1\frac{1}{2}$ pints) for each 1,000 cubic feet of space, the time of exposure to be not less than twelve hours.

Fourth. By the evolution of formaldehyde gas from formalin or formol in combination with some neutral salt, such as chloride of calcium or nitrate of soda: this mixture to be used in an autoclave. The disinfection accomplished in this manner is very effective, but is applicable only for disinfecting large quantities of mail.

Fifth. By the application of formaldehyde gas by means of a closed cylinder provided with a vacuum apparatus and special apparatus for generating and applying the gas. The gas should be applied in a dry state in not less than 20 per cent per volume strength, and the time of exposure not less than two hours.

It is understood that in any of the above methods letters, etc., must not be put up in packages, but should be placed loosely in the receptacles or rooms in such a manner as to allow a free access of the gas to all the surfaces. Newspapers and packages tightly wrapped should be opened before disinfecting.

Individual letters being sent from places where contagious or infectious disease exists can be thoroughly disinfected in the following simple manner:

By taking a small piece of blotting paper or some similar absorbent substance, dipping it into a solution of 40 per cent formaldehyde, and placing this in the envelope with the letter. This method has been in practice for some time by the officers of the Marine-Hospital Service in their work in smallpox.

Respectfully, yours.

J. J. KINYOUN,

Passed Assistant Surgeon, M. H. S., Director.

SURGEON-GENERAL MARINE-HOSPITAL SERVICE.

ACKNOWLEDGMENTS.

In closing this report, which is made at the close of a season notable by reason of the great apprehension which was felt at its beginning lest epidemic disaster should fall upon the country as a result of military and naval operations against Cuba, and notable, too, in the fact that no such results followed, I deem it proper to invite attention to the grave responsibilities and unusual exertions, continued throughout the summer and fall, which were imposed upon the Marine-Hospital Service. I desire to call attention to the spirited and self-sacrificing devotion with which the officers of the Service performed their arduous labors. This was evidenced in the field, where a number of officers were ordered in connection with the yellow fever outbreak, many of whom were not immune, and three of whom contracted the disease; at southern ports of entry, where extreme vigilance and most careful judgment was required in assisting to prevent the introduction of fever, to discover it promptly if introduced, and to deny false rumors of its presence, thus preventing unnecessary panic; at the national quarantine stations, where the labor was unusual; and, finally, in this city, where the telegraphic and other reports received requiring immediate action made necessary the closest attention at night as well as during the day on the part of the officers detailed for duty in the Bureau. Acknowledgment is also due to the clerical force of the Bureau for its efficient and cheerful service.

I have the honor to remain, respectfully, yours,

WALTER WYMAN,

Supervising Surgeon-General Marine-Hospital Service.

INDEX.

A.

	Page.
Acknowledgment of aid rendered the Coast Signal Service.....	37
Acknowledgments	828
Act of Congress for the relief of the legal representatives of John W. Branham, late an assistant surgeon in the United States Marine-Hospital Service	18
governing appointments	27
extract of, providing sleeping room for crews plying the Mississippi River and its tributaries	40, 41
Acting assistant surgeons, circular letter relating to leaves of absence of...	69
Administrative details, circular letters relating to leaves of absence of acting assistant surgeons	69
pay of medical officers, and grade, promotion, and pay of hospital stewards.....	69
concerning uniforms	70
inquiring concerning experience with smallpox	71
providing for special accommodations for revenue-cutter officers.....	71
requiring pathological specimens to be sent to hygienic laboratory	71
Admiralty decisions, report of, in cases of two seamen of the steamboat <i>Anna B. Adams</i>	41, 42
Aid to other branches of the Government service	33
Army and Navy.....	33, 37
Immigration Service	38
Life-Saving Service	38
Revenue-Cutter Service	38
Steamboat-Inspection Service	38
Alger, Hon. R. A., letter requesting detail of Marine-Hospital Service officers for duty at Cuban and Porto Rican ports and on Army transports	693
Allen, Hon. Charles H., letter relative to condition of steamer <i>Nitheroy</i> , afterwards United States cruiser <i>Buffalo</i>	685-686
letter forbidding transportation of refugees or effects from Cuba.....	672
Amaurosis, toxic, a case of (by Asst. Surg. J. B. Greene)	263
Amendments to Quarantine Regulations and quarantine circulars	718-720
Amoy, China, plague in	636-637
Anthrax œdema, a case of (by P. A. Surg. W. P. McIntosh)	233-235
Apalachicola, Fla., letter regarding disinfection of vessels bound for (Hon. Thomas W. Cridler, Third Assistant Secretary of State).....	720
letter regarding disinfection of vessels bound for from infected ports (Hon. William R. Day, Secretary of State).....	720
letter concerning sanitation of foreign vessels arriving at (Hon. William B. Sheppard, collector of customs) ..	720

	Page.
Applicants for appointment, circular of information for.....	27-31
Application for examination, form of.....	32, 33
Appointment and promotions.....	15
Appointments, act of Congress governing.....	27
Arabia, plague in.....	635, 636
Araraguara, Brazil, yellow fever in.....	583
Arkansas, regulations concerning transportation of dead bodies.....	802
Army, aid to.....	33
extension of relief to.....	35
summary of relief furnished.....	36
Army transport and port-inspection service.....	693-716
Army transport <i>Obdam</i> , reports of service on (Asst. Surg. A. R. Thomas)...	696-699
<i>Mauitoba</i> , report of service on (Asst. Surg. C. H. Lavinder).....	700-703
<i>Mauitoba</i> , report of service on (Asst. Surg. S. Tabb).....	703-705
<i>Mississippi</i> , reports of service on (Asst. Surg. John McMullen).....	705-706
<i>Chester</i> , reports of service on (Asst. Surg. S. B. Grubbs)...	707-711
<i>Minnewaski</i> , report of service on (Asst. Surg. H. B. Parker).....	712-714
<i>Roumanian</i> , report of service on (A. A. Surg. J. S. Hough).....	711-716
Army transports, correspondence with War Department regarding.....	672-716
arriving at Montauk Point, N. Y., statement of.....	692
Astoria, Oreg., quarantine station at.....	710-741
Autopsic findings in cases of suspected yellow fever, value of (article by P. A. Surg. Eugene Wasdin).....	432-440
B.	
Bacteriology of yellow fever.....	428-431
Bahia, Brazil, yellow fever in.....	583
Bailhache, P. H., Surg., article by, "A précis of the United States quarantine regulations for domestic ports, with reference to preventing the introduction of yellow fever into the United States.....	415-420
Baltimore marine hospital (report of Surg. George Purviance).....	52
Banks, Charles E., Surg., detailed by the President as delegate to the meeting in Madrid, Spain, of the Ninth International Congress of Hygiene and Demography.....	18
detail to National Pure Food and Drug Congress, Washington, D. C.....	18
report as delegate to the Ninth International Congress of Hygiene and Demography.....	20-23
report on hospital equipment, ward furniture, ambulances, etc., in Europe.....	23-26
(acting medical purveyor) letter to Surgeon-General.....	74, 75
Barge <i>Protector</i> , specifications of.....	741-744
Bartlett, John R., Superintendent Coast Signal Service, letter acknowledging aid.....	37
Blank forms for inspection of marine hospital and relief stations.....	44-52
Boards convened for examination of candidates for admission to the Service.....	15
Bombay, cholera in.....	528
plague in.....	632-634
Booth, A. R., A. A. Surg., letter reporting admiralty decisions in cases of two seamen of the steamboat <i>Anna B. Adams</i>	41, 42
Boston marine hospital (report of Surg. Fairfax Irwin).....	52, 53
Branham, John W., Asst. Surg., measures for relief of legal representatives.....	17
an act for the relief of legal representatives of.....	18

	Page.
Bradley, W. O., governor of Kentucky, telegram relative to smallpox in Middlesboro	615
Bratton, W. D., P. A. Surg., death of	16
British Columbia, report of inspection of the William Head Quarantine Sta- tion (P. A. Surg. S. D. Brooks)	667-669
Brooks, S. D., P. A. Surg., detail to Washington State Medical Society, Seattle, Wash	18
report on the meeting of the Washington Medical Society, Seattle, Wash	27
report of inspection of the British Columbia Quar- antine Station at William Head, B. C	667-669
report on Port Townsend Quarantine Station.....	739-740
Brown, B. W., P. A. Surg., report on smallpox in Patton and Jasper, Ala	607-608
report on Cape Fear Quarantine Station	725
Browns town, St. Anns, Jamaica, yellow fever in	584
Brownsville, Tex., appointment of sanitary inspectors and guards at	716
Brunner, W. F., sanitary inspector, article by, "Suggestions to persons living in cities infected with yellow fever"	335-338
Brunswick Quarantine Station, report on (Sanitary Inspector R. E. L. Bur- ford)	728
Buff Bay, Jamaica, yellow fever in	584
<i>Buffalo</i> , United States cruiser, formerly steamer <i>Netheroy</i> , disinfection of ..	682-686
Burford, R. E. L., sanitary inspector, report on Brunswick Quarantine Station	728

C.

Cairo Marine Hospital (report of Surg. P. C. Kallock)	53
Calcutta, cholera in	528
plague in	635
Candidates for appointment, circular of information for	27-31
Cape Charles Quarantine Station, report on (P. A. Surg. W. J. Pettus)	723-725
Cape Fear Quarantine Station, report on (P. A. Surg. B. W. Brown)	725
Cape Haitien, Haiti, yellow fever in	584
Cardenas, Cuba, yellow fever in	584
Care of seamen, contracts for	60-68
Carmichael, D. A., Surg., report on marine hospital at Cleveland, Ohio	54
report of inauguration of inspection service at Honolulu	656-659
Cartagena, Colombia, yellow fever in	584
Casualties	16
Carter, H. R., Surg., detail to quarantine conference, Atlanta, Ga	18
New Orleans, La	18
Mobile, Ala	18
report on marine hospital at New Orleans, La	57, 58
article by, "Hygiene of persons living within an area of yellow fever infection"	319-329
"A précis on hygienic measures to be taken in a town infected with yellow fever"	339-357
"Measures to be taken in a district threat- ened by yellow fever"	358-360
"Communication with an infected town" ..	373-377
"Train inspection"	441-454
report of condition of affairs at Franklin, La	551-552
directions to train inspectors	566-567
Ceara, Brazil, yellow fever in	583

	Page.
Chamberlain, Eugene T. (Commissioner Bureau of Navigation).....	
Circular requiring death of foreign seamen to be reported to consul	42
suspending tonnage duty on vessels from Copenhagen	43
Charlotte, N. C., investigation of reports of smallpox in.....	623, 624
Charts, temperature	94, 96
Chicago Marine Hospital (report of Surg. H. W. Sawtelle).....	53
China, cholera in	528
plague in.....	636-637
Chester, army transport, reports of service on (Asst. Surg. S. B. Grubbs) ...	707-711
Cholera in China	528
India	528
Japan	528
Straits Settlements	528
Cienfuegos, Cuba, yellow fever in.....	584
Cincinnati Marine Hospital (report of A. A. Surg. J. W. Stephenson)	54
Circular (Supervising Insp. Gen. James A. Dumont) providing for sleeping room for crews plying the Mississippi River and its tributaries...	40, 41
for the information of candidates for appointment into the service.	27-31
construing paragraph 470, Regulations Marine-Hospital Service, and fixing rate of charges for care of officers and men of the Navy	36
(Commissioner Eugene T. Chamberlain) requiring death of foreign seamen to be reported to consul	42
suspending collection of tonnage duty on vessels from Copenhagen.	43
contracts for care of seamen	60-68
relative to obtaining material for pathological instruction (Surgeon-General Wyman).....	823
Circulars amending quarantine regulations.....	718-720
Circular letter relative to pay of medical officers	69
relative to leaves of absence of acting assistant surgeons....	69
relative to grade, promotion, and pay, of hospital steward...	69
leaves of absence of acting assistant surgeons	69
pay of medical officers and grade, promotion and pay of hospital stewards.....	69
relative to employment of attendants in accordance with civil-service rules	70
concerning uniforms.....	70
inquiry concerning experience with smallpox	71
providing for special accommodations for revenue-cutter officers.....	71
requiring pathological specimens to be sent to Hygienic Laboratory	71, 72
relative to records of post-epidemic disinfection	425
relating to post-epidemic disinfection and aeration..	425-427, 540, 541
concerning post-epidemic disinfection	539
Cleveland Marine Hospital (report Surg. D. A. Carmichael)	54
Coast Signal Service, acknowledgment of aid rendered	37
Cobb, J. O., P. A. Surg., article by, "Observations, comments on the diagnosis, climatic isolation, and future control of the consumptive sailor"	236-250
report on source of yellow-fever infection in Mississippi in 1898.....	570-578
Cofer, L. E., Asst. Surg., article by, "A portable operating room".....	260, 261
Colon, Colombia, yellow fever in.....	584

	Page.
Colorado, regulations concerning transportation of dead bodies	802
Colson, Hon. David G., letter relative to smallpox in Middlesboro, Ky.	613
Columbia and Sumter, S. C., smallpox in	625, 627
Communication with an infected town	373-377
Congress, act of, for the relief of the legal representatives of John W. Bran-	
ham, late an assistant surgeon in the United States Marine-	
Hospital Service	18
governing appointments	27, 28
extract from, providing sleeping room for crews plying the	
Mississippi River and its tributaries	40, 41
Connecticut, regulations concerning transportation of dead bodies	802
Consumptive sailor, observations, comments on the diagnosis, climatic isola-	
tion, and future control of the (by P. A. Surg. J. O. Cobb)	236-250
Contracts for care of seamen	60-68
Contributed articles, observations, comments on the diagnosis, climatic iso-	
lation, and future control of the consumptive sailor	
(by P. A. Surg. J. O. Cobb)	236-250
portable operating room (by Asst. Surg. L. E. Cofer) ..	260, 261
reports on tuberculosis and on the etiology of beriberi	
(by Acting Sanitary Inspector W. Havelburg)	280-282
medical and surgical	230-282
statistics of the Pasteur Institute at Rio and report on	
the vaccination institute in that city for the year	
1897	283, 284
Copenhagen, Denmark, suspension of collection of tonnage duty on vessels	
from	43
Corbin, H. C., Adjutant-General, letter regarding army transports	673-674
order of Secretary of War concerning san-	
itary precautions at Santiago, Cuba	689-690
order of Secretary of War relative to quar-	
antine precautions at Montauk Point,	
New York	690
order of Secretary of War placing all san-	
itary matters pertaining to army trans-	
ports under the jurisdiction of the Ma-	
rine-Hospital Service	694
Corput, G. M., A. A. Surg., report on Egmont Key Detention Camp.	680, 682
Correspondence relative to inspection of emigrants at Naples, Italy	660-667
with Navy Department relative to yellow fever	671-672
regarding army transports	672-716
Crews plying the Mississippi River and its tributaries, sleeping room for ...	40, 41
Cridler, Hon. Thomas W., Third Assistant Secretary of State, letter to Sec-	
retary of Treasury, transmitting copy of dispatch	
relative to steps taken to keep plague out of	
Morocco	638
letters relative to inspection of emigrants at	
Naples, Italy	661-662
letter regarding disinfection of vessels bound for	
Apalachicola, Fla	720
Cuba, yellow fever in	578-579
sanitary inspection at Havana	649-651
vaccination at Havana	650
Santiago, sanitary inspector at	651
sanitary precautions at Santiago, order of Secretary of War con-	
cerning	689-690

	Page.
Danish West Indies, leprosy in	644
Day, Hon. William R., Secretary of State, letter regarding disinfection of vessels bound for Apalachicola, Fla., from infected ports	720
Dead bodies, transportation of in the United States	801-807
Deaths of foreign seamen to be reported to consul	42
Deck crews on Western rivers, shelter for	40, 41
de Castro, Hector, consul-general at Rome, letters relative to inspection of emigrants at Naples	660-663
Delaware Breakwater marine hospital (report of P. A. Surg. George B. Young)	55
Delaware Breakwater quarantine station, report on (P. A. Surg. G. B. Young)	722-723
Denmark, leprosy in	644
Descalvado, Brazil, yellow fever in	583
Detroit marine hospital (report of Surg. John Godfrey)	54, 55
Diagnosis of yellow fever (Murray)	289-295
(Guiteras)	296-300
Diagram, railroads, Jackson, Miss	452
Disinfection, post-epidemic	425-427
Disinfection of railway coaches	568, 569
District of Columbia, regulations concerning transportation of dead bodies	803
Division of sanitary reports and statistics:	
Mortality statistics, tables of	776-800
Transportation of dead bodies in the United States	801-807
Djiddah, Arabia, plague in	635, 636
Document, Senate, No. 232, Fifty-fifth Congress	34
Draper, Wm. F., United States ambassador at Rome, letter relative to inspection of emigrants at Naples	660
Dumont, Jas. A., Supervising Inspector-General Steam Vessels, circular relative to sleeping room for crews plying the Mississippi River and its tributaries	40, 41
Dysentery, epidemic in Japan	655

E.

Eagle Pass, Tex., appointment of sanitary inspectors and guards at	716
Eagleson, J. B., Acting Assistant Surgeon, article by, "The radical cure of hernia, with report of cases"	267-279
Egmont Key Detention Camp, extracts from reports on (P. A. Surg. H. D. Geddings)	677-679
extracts from reports on (P. A. Surg. A. H. Glennan)	680
report on (A. A. Surg. G. M. Corput)	680-682
Eldridge, Stuart, M. D., United States sanitary inspector at Yokohama, Japan, reports of	652-655
El Paso, Tex., appointment of sanitary inspectors and guards at	716
Emigrants, inspection of, at Naples, Italy	659-667
Evansville marine hospital (report of P. A. Surg. James H. Oakley)	55, 56
Expenditures and receipts	79-82
Examination of candidates for admission into the Service, board convened for	15
application for, form of	32
specimen list of questions used in	32, 33

	Page.
Exposition, Trans-Mississippi, Omaha, Nebr	40
Extension of relief to Army and Navy	35-37

F.

Fair Oaks, Ark., smallpox in	622, 623
Femoral hernia, a case of (by P. A. Surg. J. B. Stoner)	251
Femur, ununited fracture of, a case of (by P. A. Surg. G. B. Young)	256-258
Financial statement	79-82
Floating quarantine plant <i>Protector</i> , specifications of	741-744
Florida, extracts from reports on Egmont Key Detention Camp (P. A. Surg. H. D. Geddings)	677-679
extracts from report, on Egmont Key Detention Camp (P. A. Surg. A. H. Glennan)	680
regulations concerning transportation of dead bodies	803
Foreign seamen, deaths of, to be reported to consul	42
Fracture of femur, ununited, a case of (by P. A. Surg. G. B. Young)	256-258
Franklin, La., outbreak of yellow fever in	550-555
Fukuoka Ken, cholera in	528

G.

Gage, Hon. L. J., Secretary, letter to the President relative to John W. Branham, late assistant surgeon, M. H. S.	17
letter to Secretary of State relative to intro- duction of plague into Europe	641
letter relative to yellow fever	671
letter requesting that transportation of refu- gees or effects from Cuba be forbidden	672
letter regarding Army transports	673
letter relative to condition of steamer <i>Nie-</i> <i>theroy</i> , afterwards United States cruiser <i>Buffalo</i>	685
letters and memorandum relative to quaran- tine precautions at Montauk Point, N. Y.	688-689
detailing board to select site for a national quarantine station at Astoria, Ore.	741
letter concerning quarantine legislation	760
Gassaway, J. M., Surg., detail to American Medical Association, Denver, Colo.	18
report on meeting of American Medical Association.	18-20
report on marine hospital at San Francisco, Cal.	59
Geddings, H. D., P. A. Surg., article by, "Therapeutic treatment of yellow fever"	313-318
article by, "Hygienic measures to be adopted by persons living within an area of yellow- fever infection"	333, 334
report of investigation of yellow fever	590-593
reports on Egmont Key Detention Camp, ex- tracts from	677-679
Gibson, L. P., A. A. Surg., telegrams relative to smallpox in Little Rock, Ark	624
Glennan, A. H., P. A. Surg., article by, "Measures to be taken in an infected and noninfected town"	361-366
reports on Egmont Key Detention Camp, ex- tracts from	680
<i>Glenturret</i> , ship, plague on	637
Godfrey, John, Surg., report on marine hospital at Detroit, Mich.	54, 55
Goodnow, John, consul-general, report on plague on ship <i>Glenturret</i>	637

	Page.
Greene, J. B., Asst. Surg., article by "Toxic amaurosis".....	263
Grubbs, S. B., Asst. Surg., reports of service on Army transport <i>Chester</i>	707-711
Gulf Quarantine Station, refutation of charges against.....	530
report on (P. A. Surg. A. C. Smith).....	730, 735
report of the special committee of the Senate appointed to investigate and report upon the advisability of the removal of.....	534-536
Guiteras, G. M., P. A. Surg., report on marine hospital at Key West, Fla....	56
Guitéras, John, A. A. Surg., article by, "Diagnosis of yellow fever".....	296-300

H.

Habana, Cuba, yellow fever in.....	584
sanitary inspection at.....	649-651
vaccination at.....	650
Haffkine's serum.....	641-642
Hardwar, India, plague in.....	634
Hastings, Hill, Asst. Surg., report on smallpox in Middlesboro, Ky.....	620-622
Havelburg, W., acting sanitary inspector, reports on tuberculosis and on the etiology of beriberi.....	280-282
article on the statistics of the Pas- teur Institute at Rio, and report on the vaccination institute of that city for the year 1897.....	283, 284
Hawaii, sanitary inspection at Honolulu.....	655-659
Hay, Hon. John, Secretary of State, letter relative to inspection of emi- grants at Naples, Italy.....	663
Health authorities, State and local, relations with.....	745
Hernia, femoral, a case of (by P. A. Surg. J. B. Stoner).....	251
radical cure of, with report of cases (by A. A. Surg. J. B. Eagleson).....	267-279
sutures used in operations for.....	268-270
Herniotomies, cases of (by Asst. Surg. H. S. Mathewson).....	264-266
Hioga, cholera in.....	528
Hongkong, cholera in.....	528
plague in.....	636
Honolulu, sanitary inspection at.....	655-659
Hospital equipment, etc., in Europe.....	23-26
stewards, circular letter relative to grade, promotion, and pay of..	69
Hospitals, repairs of.....	52-60
Hough, J. S., A. A. Surg., report of service on Army transport <i>Roumanian</i> ..	714-716
Hubli, India, plague in.....	634
Hygiene of persons living within an area of yellow fever infection (Carter)...	319-329
(Wasdin).....	330-332
Hygienic Laboratory, circular letter requiring pathological specimens to be sent to.....	71
report of the.....	808-827
Hygienic measures to be adopted by persons living within an area of yellow fever infection (Geddings).....	333, 334

I.

Iceland, leprosy in.....	644
Illinois, regulations concerning transportation of dead bodies.....	803
Illustrations:	
Temperature charts.....	94-96
Human skull, showing site of fracture.....	255

Illustrations—Continued.	Page.
Human femur (Figs. 1, 2, and 3), showing line of fracture and position of fragments.....	257
A portable operating room	260
ready for use	261
Sutures used in operations for hernia	268-270
Diagram of an infected town and contiguous territory	442
Maps for McHenry, Miss	450
Diagram of railroad, Jackson, Miss	452
Immigration Service, aid to	38, 39
stations, summary of reports from.....	39
India, cholera in	528
plague in	632-635
Indiana, regulations concerning transportation of dead bodies.....	804
Inspection blanks.....	44-52
of emigrants at Naples, Italy	659-667
Instructions to officers in charge of post-epidemic disinfection	541
Interstate quarantine regulations, synopsis of.....	412-414
Investigations of the causes of yellow fever	584
Iowa, regulations concerning transportation of dead bodies.....	804
Irwin, Fairfax, Surg., report on marine hospital at Boston, Mass	52, 53
Ishikawa Ken, cholera in	528
Italy, inspection of emigrants at Naples	659-667
J.	
Jaboticabal, Brazil, yellow fever in	583
Jackson, Miss., diagram of railroads	452
Jamaica, yellow fever in	579
Japan, cholera in	528
leprosy in (table).....	643
reports of sanitary inspector at Yokohama.....	652, 653
dysentery in.....	655
Jasper and Patton, Ala., smallpox in	607, 608
Jiminez, Mexico, yellow fever in	584
Johnson, A. Burlingame, United States consul, report on plague in Amoy, China	637
K.	
Kalloch, P. C., Surg., report on marine hospital at Cairo, Ill.....	53
article by, "A case of Raynaud's disease"	230
report of measures taken at Franklin, La.....	553-555
Kanagawa Ken, cholera in	528
Karachi, India, plague in	634
Key West marine hospital (report of P. A. Surg. G. M. Guitéras)	56
Khatkan Khan Kalan, India, plague in.....	634
Kingston, Jamaica, yellow fever in	584
Kinyoun, J. J., P. A. Surg., detail to American Medical Association, Denver, Colo	18
to National Pure Food and Drug Congress, Wash- ington, D. C.....	18
report of, on Hygienic Laboratory.....	808-827
report on disinfection of mail matter.....	826, 827
L.	
Laboratory, Hygienic, report of the	803-827
investigation regarding etiology of variola	809
bacteriological examination of Potomac water supply.....	809-824

	Page
Laboratory, Hygienic, instructions to officers of the service	824
car sanitation	824, 825
material for pathological instruction	825
microscopical and chemical examinations	825, 826
prospectus of work of, during 1899	826
report on disinfection of mail matter	826, 827
recommendations of director of	826
Laredo, Tex., appointment of sanitary inspectors and guards at	716
Lavinder, C. H., Asst. Surg., report of service on army transport <i>Manitoba</i> ..	700-703
Leaves of absence of acting assistant surgeons, circular letter relating to...	69
Leprosy	643-648
in Japan (table)	643
in Denmark	644
in Iceland	644
in Danish West Indies	644
investigation of	646-648
proposed legislation relative to investigation of	646-648
Life-Saving Service, aid to	38
Limon, Costa Rica, yellow fever in	584
List of marine hospitals	34
quarantine stations	35
marine hospitals in which officers and men of the Army and Navy were treated	37
Little Rock, Ark., smallpox in	624, 625
Location of bullet by X ray, a case of (by P. A. Surg. R. M. Woodward)	231, 232
Long, Hon. J. D., letter relative to yellow fever	671
Louisiana, outbreak of yellow fever in	544-578
outbreak of yellow fever in Franklin	550-555
spread of yellow fever in	556-558
regulations concerning transportation of dead bodies	804
Louisville marine hospital (report of P. A. Surg. W. P. McIntosh)	56, 57

M.

McHenry, Miss., maps for	450
outbreak of yellow fever in	544-550
McIntosh, W. P., P. A. Surg., report on marine hospital at Louisville, Ky	56, 57
article by, "Anthrax œdema"	233-235
McKay, W. W., A. A. Surg., report on San Diego quarantine station	735-737
McMullen, John, Asst. Surg., report on marine hospital at Vineyard Haven, Mass	60
reports of service on army transport <i>Mississippi</i> ..	705-706
Madras, cholera in	528
Magruder, G. M., P. A. Surg., report on marine hospital at Memphis, Tenn...	57
on smallpox in Birmingham, Ala	600-602
on smallpox in Jefferson County, Ala... ..	603-604
on smallpox in Newton and Pinckard, Ala	604-605
of diminution of cases of smallpox in Jefferson County, Ala	605-606
of cases of smallpox occurring in Jef- ferson County, Ala	666-007
on smallpox in Cartersville, Ga.	607
of work in suppressing smallpox in Alabama	608-613
on smallpox in Little Rock, Ark.....	625

	Page.
Mail matter, disinfection of, report on, Kinyoun.....	826-827
Maine, regulations concerning transportation of dead bodies	804
Manchester, Jamaica, yellow fever in	584
Manitoba, army transport, report of service on (Asst. Surg. C. H. Lavinder)..	700-703
(Asst. Surg. S. Tabb).....	703-705
Manzanillo, Cuba, yellow fever in.....	584
Maps for McHenry, Miss	450
Marine hospitals, list of.....	34
in which officers and men of the Army and Navy	
were treated.....	37
and relief furnished.....	44
in hospital.....	44
in dispensary	44
and relief stations, inspection of (blank forms).....	44-52
statement of repairs made and needed.....	52-60
Baltimore.....	52
Boston	52, 53
Cairo.....	53
Chicago	53
Cincinnati.....	54
Cleveland	54
Detroit.....	54, 55
Delaware Breakwater.....	55
Evansville.....	55, 56
Key West	56
Louisville	56, 57
Memphis	57
Mobile.....	57
New Orleans.....	57, 58
Portland, Me	58
Port Townsend	58
St. Louis	59
San Francisco	59
Vineyard Haven	60
Wilmington, N. C.....	60
Maritime quarantine regulations relating to yellow fever, explanation of ..	421-424
Matanzas, Cuba, yellow fever in.....	584
Mathewson, H. S., Asst. Surg., article by, "Herniotomies"	264-266
Mead, F. W., Surg., report on marine hospital at Portland, Me.....	58
Measures to be taken in a district threatened by yellow fever.....	358-360
in an infected and noninfected town	361-366
to prevent the propagation of yellow fever from an	
infected to a noninfected locality	367-369
Medical Corps:	
Appointments and promotions.....	15
Board convened for examination of applicants.....	15
Casualties	16
Resignation.....	16
Medical officers, circular letter relative to pay of.....	69
circular letter to, concerning experience with smallpox....	71
Memphis marine hospital (report of P. A. Surg. G. M. Magruder).....	57
Merida, Yucatan, yellow fever in.....	584
Mexico, yellow fever in	580
Michigan, regulations concerning transportation of dead bodies	804
Middlesboro, Ky., smallpox in	613-622
telegrams relative to smallpox in	613-616

	Page.
Middlesboro, Ky., smallpox in, telegram relative to (Governor W. O. Bradley).....	615
reports on smallpox in (P. A. Surg. C. P. Wertenbaker)...	616-620
report on smallpox in (Asst. Surg. Hill Hastings)	620-622
<i>Minnewaski</i> , army transport, report of service on (Asst. Surg. H. B. Parker) ..	712-714
Mississippi, extract from the report of the select committee of the house and senate of the legislature of, appointed to investigate the matter of the late yellow fever epidemic in	534
outbreak of yellow fever in McHenry	544-550
outbreak of yellow fever in	544-578
spread of yellow fever in	556-558
regulations concerning transportation of dead bodies	804
<i>Mississippi</i> , army transport, reports of service on (Asst. Surg. John McMullen)	705-706
Mississippi River and tributaries, sleeping room for crews plying	40-42
Mobile Marine Hospital (report of Surg. R. D. Murray)	57
Montauk Point, N. Y., letters and memorandums relative to quarantine precautions at (Surgeon-General Wyman)	686-692
order of Secretary of War relative to quarantine precautions at	690
statement of army transports arriving at	692
Monterey, Mexico, yellow fever in	584
Morant Bay, Jamaica, yellow fever in	584
Morocco, regulations to prevent introduction of plague into	638-640
regulations concerning arrival of pilgrims at ports of	640
Mortality statistics, tables of, in cities and towns of the United States, 1897.	776-800
Murray, R. D., Surg., detail to quarantine conference, Atlanta, Ga.	18
report on marine hospital at Mobile, Ala.	57
circular letter on diagnosis of yellow fever, addressed to certain physicians on the Gulf coast	289-295
article by, "Treatment of yellow fever"	301-312

N.

Naples, Italy, inspection of emigrants at	659-667
National quarantine administration (foreign)	649-669
sanitary inspection at Habana	649-651
vaccination at Habana	650
sanitary inspector at Santiago	651
sanitary inspection at Rio de Janeiro	651-652
reports of sanitary inspector at Yokohama, Japan	652-655
sanitary inspection at Honolulu	655-659
report of inauguration of inspection service at Honolulu (Surg. D. A. Carmichael)	656-659
inspection of emigrants at Naples, Italy	659-667
report of inspection of the British Columbia Quarantine station at William Head, British Columbia (P. A. Surg. S. D. Brooks)	667-669
(domestic)	670-700
yellow fever precautions in 1898	670
regulations for naval war vessels	670

	Page.
National quarantine administration (domestic), United States Navy request-	
ed to intercept small craft	
and refugees from Cuba...	671
letter relative to yellow fever	
(Hon. J. D. Long)	671
letter relative to yellow fever	
(Hon. L. J. Gage)	671
correspondence with War	
Department regarding	
army transports	672-716
Navy Department to forbid	
transportation of refugees	
or effects from Cuba.....	672
letter requesting that trans-	
portation of refugees or	
effects from Cuba be for-	
bidden (Hon. L. J. Gage)..	672
letter forbidding transpor-	
tation of refugees or ef-	
fects from Cuba (Hon.	
Chas. H. Allen)	672
protest of board of health of	
Portsmouth, Va., against	
debarkation of troops from	
Cuba.....	675
letter relative to transporting	
troops to Tampa, Fla. (Hon.	
O. L. Spaulding)	675
letter directing enforcement	
of quarantine regulations	
at Port Tampa, Fla. (Hon.	
O. L. Spaulding).....	676
letter relative to quarantine	
regulations in Florida (Sur-	
geon-General Wyman)....	676
Detention camp, Egmont	
Key, Fla.	676-677
extracts from reports on Eg-	
mont Key Detention Camp	
(P. A. Surg. H. D. Ged-	
dings).....	677-679
extracts from reports on Eg-	
mont Key Detention Camp	
(P. A. Surg. A. H. Glennan).	680
report on Egmont Key Deten-	
tion Camp (A. A. Surg. G.	
M. Corput)	680, 682
disinfection of steamer <i>Nic-</i>	
<i>theroy</i> , afterwards the	
United States cruiser <i>Buf-</i>	
<i>falo</i>	682-686
letters and memorandums	
relative to quarantine pre-	
cautions at Montauk Point,	
N. Y. (Surgeon-General	
Wyman)	686-692

	Page.
National quarantine administration (domestic), floating quarantine plant	
<i>Protector</i> , specifications	
of.....	741-744
legislation.....	745-772
Senate bill 2680	
and report on.	749-756
House bill 4363.	757-760
letter of Secretary of Treasury	760
statement of Surgeon-General Wyman	
regarding ...	761-766
reports of House committee on House bill No. 4363	766-772
regulations concerning transportation of dead bodies in the United States..	801-807
stations, reports from	721-740
station at Astoria, Oreg	740-741
Naval war vessels, regulations for.....	670
Navy, aid to	33-35
extension of relief to.....	35
relief for officers and men of	36
summary of relief furnished.....	36-37
Department requested to intercept small craft and refugees from Cuba.	671
to forbid transportation of refugees or effects from Cuba.	672
Nebraska, regulations concerning transportation of dead bodies.....	804
Necropsies and reports of fatal cases.....	85-226
New Hampshire, regulations concerning transportation of dead bodies.....	805
New Jersey, regulations concerning transportation of dead bodies.....	805
New Mexico, regulations concerning transportation of dead bodies.....	805
New Orleans marine hospital (report of Surg. H. R. Carter).....	57, 58
New York, smallpox in	599-600
regulations concerning transportation of dead bodies.....	805
<i>Nietheroy</i> , steamer, afterwards U. S. cruiser <i>Buffalo</i> , disinfection of.....	682-686
Norman, Seaton. Asst. Surg., article by, "Measures to be adopted to prevent the propagation of yellow fever from an infected to a noninfected locality".	367-369
North Carolina, regulations concerning transportation of dead bodies.....	805
North Dakota, regulations concerning transportation of dead bodies	805
Number of patients treated during the year	44
Nydegger, J. A., P. A. Surg., report on South Atlantic Quarantine Station ...	726-728

O.

Oakley, Jas. H., P. A. Surg., report on marine hospital at Evansville, Ind	55
article by, "Wound of foot"	262
<i>Obdam</i> , army transport, reports of service on (Asst. Surg. A. R. Thomas).....	696-699
Officers detailed to represent the service at meetings of medical and public health associations (Surg. J. M. Gassaway, P. A. Surg. J. J. Kinyoun, Surg. R. D. Murray, Surg. H. R. Carter, Surg. C. E. Banks, P. A. Surg. J. H. White, P. A. Surg. A. C. Smith, P. A. Surg. S. D. Brooks).....	18

	Page.
Officers in charge of post-epidemic disinfection, instructions to	541
Revenue-Cutter Service, circular letter providing special accommodations for officers of	71
Ohio, regulations concerning transportation of dead bodies	805
Okayama, cholera in	528
Osaka and Hiogo, cholera in	528
Oklahoma, regulations concerning transportation of dead bodies	806
Operating room, portable, article by Asst. Surg. L. E. Cofer	260, 261
Operations for hernia, sutures used in	268-270
Omaha, Nebr., Trans-Mississippi Exposition	40
P.	
Para, Brazil, yellow fever in	583
Paralysis, syphilitic, a case of (by P. A. Surg. G. B. Young)	258, 259
Parker, H. B., Asst. Surg., report of service on Army transport <i>Minnewaski</i> ..	712-714
Partridge, Frank C., United States consul-general, dispatch relative to plague	639
Pasteur Institute at Rio, statistics of the, and report on the vaccination institute of that city for the year 1897	283, 284
Pathological specimens, circular letter relative to	71
Patients, number treated during the year	44
in hospital	44
in dispensary	44
Patterson, R. F., United States consul-general, report on plague in Calcutta, India	635
Patton and Jasper, Ala., smallpox in	607-608
Pennsylvania, regulations concerning transportation of dead bodies	806
Perry, J. C., P. A. Surg., report on marine hospital at Port Townsend, Wash .	58
Pettus, P. A. Surg., telegram relative to disinfection of steamer <i>Nietheroy</i> , afterwards United States cruiser <i>Buffalo</i>	683
report on Cape Charles quarantine station	723-725
Pilgrims, regulations concerning arrival of, at Moorish ports	640
Pilgrimages, Russian and French, restrictions of	640-641
Plague	632-642
in Bombay	632-634
Hardwar	634
Hubli	634
Karachi	634
Khatkar Khan Kalan	634
Poona	634
Sholapoor	634
Surat	634
Calcutta	635
Djiddah	635-636
Hongkong	636
Amoy	636-637
on ship <i>Glenturret</i>	637
regulations to prevent introduction of, into Morocco	638-640
concerning arrival of pilgrims at Moorish ports	640
Russian and French restrictions of pilgrimage	640-641
Haffkines's serum-preventive inoculation	641-642
letter to Secretary of State relative to introduction of, into Europe (Hon. L. J. Gage)	641
Poona, India, plague in	634
Portable operating room, article by Asst. Surg. L. E. Cofer	260, 261
Port Antonio, Jamaica, yellow fever in	584

	Page.
Port au Prince, Haiti, yellow fever in	584
Port inspection and Army transport service.....	693-716
Portland Marine Hospital (report of Surg. F. W. Mead)	58
Port Townsend Marine Hospital (report of P. A. Surg. J. C. Perry)	58
Port Townsend Quarantine Station, report on (Surg. S. D. Brooks).....	739, 740
Post-epidemic disinfection	539
circular concerning.....	539
instructions to officers in charge of.....	541
and aeration, circular letter relating to	540-541
Précis on hygienic measures to be taken in a town infected with yellow fever (Carter).....	339-357
detention camp management	378-388
of the United States quarantine regulations for domestic ports.....	415-420
President, the, proclamation of, suspending collection of tonnage duty on vessels from Copenhagen.....	43, 44
Prochazka, Emil, Asst. Surg., death of	16
Promotions and appointments.....	15
<i>Protector</i> , disinfecting barge, specifications of.....	741-744
Public health service.....	525-827
Purveying division, report of.....	72-75
Purviance, George, Surg., report on marine hospital at Baltimore, Md.....	52

Q.

Quarantine administration (foreign).....	649-669
sanitary inspection at Habana.....	649-651
vaccination at Habana.....	650
sanitary inspector at Santiago.....	651
sanitary inspection at Rio de Janeiro... ..	651-652
reports of sanitary inspector at Yokohama, Japan	652-655
sanitary inspection at Honolulu.....	655-659
report of inauguration of inspection service at Honolulu (Surg. D. A. Carmichael)	656-659
inspection of emigrants at Naples, Italy.	659-667
report of inspection of the British Columbia quarantine station at William Head, British Columbia (P. A. Surg. S. D. Brooks).....	667-669
Quarantine administration (domestic)	670-720
regulations for naval war vessels....	670
yellow fever precautions in 1898.....	670
letter relative to yellow fever (Hon. J. D. Long)	671
United States Navy requested to intercept small craft and refugees from Cuba.....	671
letter relative to yellow fever (Hon. L. J. Gage).....	671
letter forbidding transportation of refugees or effects from Cuba (Hon. Chas. H. Allen).....	672
letter requesting that transportation of refugees or effects from Cuba be forbidden (Hon. L. J. Gage).....	672

	Page.
Rate of charge for soldiers and seamen of the Navy admitted to marine hospitals.....	36
Raynaud's disease, a case of (by Surg. P. C. Kallock).....	230
Receipts and expenditures	79-82
Reedy Island Quarantine Station, report on (P. A. Surg. R. M. Woodward)...	721
Refutation of charges against the United States quarantine station (Gulf Quarantine) at Ship Island, Miss	530
Regla, Cuba, yellow fever in.....	584
Regulations, maritime quarantine, relating to yellow fever, explanation of.	421-424
a précis of, for domestic ports	415-420
revision of	27
of traffic to, from, and through yellow-fever-infected towns...	370-372
Relief, extension of, to Army and Navy	35
furnished Army and Navy, summary of	36, 37
for officers and men of the Navy.....	36, 37
Repairs of hospitals.....	52-60
Report of Surgeon-General to Secretary	15-828
on the forty-ninth annual meeting of the American Public Health Association.....	18-20
the Ninth International Congress of Hygiene and Demography..	20-23
hospital equipment, ward furniture, ambulances, etc., in Europe.	23-26
the meeting of the Washington State Medical Society, Seattle, Wash	27
of admiralty decisions in cases of two seamen of the steamboat <i>Anna B. Adams</i>	41, 42
purveying division.....	72-75
the special committee of the Senate appointed to investigate and report upon the advisability of the removal of the Ship Island Station	534-536
extract from the, of the select committee of the house and senate of the legislature of Mississippi appointed to investigate the matter of the late yellow fever epidemic in Mississippi.....	534
of Surg. J. H. White upon the yellow fever epidemic of 1897.....	536-539
condition of affairs in connection with yellow fever at Franklin, La.	551-552
measures taken in connection with yellow fever at Franklin, La.	553-555
source of yellow fever infection in Mississippi in 1898.....	570-578
investigation of yellow fever (Surg. Eugene Wasdin).....	587-590
investigation of yellow fever (P. A. Surg. H. D. Geddings).....	590-593
tests of Sanarelli's serum antiamaryllic (Surg. Eugene Wasdin)...	594-597
on smallpox in Birmingham, Ala. (P. A. Surg. G. M. Magruder).....	600-602
Cartersville, Ga. (P. A. Surg. G. M. Magruder).....	607
Charlotte, N. C. (P. A. Surg. C. P. Wertenbaker).....	623, 624
Columbia and Sumter, S. C. (P. A. Surg. C. P. Wertenbaker).....	626-627
Jefferson County, Ala. (P. A. Surg. G. M. Magruder)...	603-604
Little Rock, Ark. (P. A. Surg. G. M. Magruder).....	625
Newton and Pinckard, Ala. (P. A. Surg. G. M. Magruder)	604-605
Patton and Jasper, Ala. (P. A. Surg. B. W. Brown)...	607-608
of diminution of cases of smallpox in Jefferson County, Ala. (P. A. Surg. G. M. Magruder)	605-606
by weeks, of cases of smallpox occurring in Jefferson County, Ala. (P. A. Surg. G. M. Magruder)	606-607
résumé of work in suppressing smallpox in Alabama (P. A. Surg. G. M. Magruder)	608-613

	Page
Report on the plague in Calcutta (United States Consul-General A. F. Pat- terson)	635
Amoy, China (United States Consul A. Burlingame Johnson)	637
on ship <i>Glenturret</i> (Consul-General John Goodnow) ...	637
of inspection of the British Columbia Quarantine Station at William Head, British Columbia (P. A. Surg. S. D. Brooks)	667-669
on Egmont Key Detention Camp (Actg. Asst. Surg. G. M. Corput) ...	680-682
of board convened to investigate condition of steamer <i>Nietheroy</i> , afterwards U. S. cruiser <i>Buffalo</i>	684-685
service on the army transport <i>Manitoba</i> (Asst. Surg. C. H. Lavin- der)	700-703
(Asst. Surg. S. Tabb)	703-705
Reports from immigrant stations, summary of	39
of repairs of marine hospitals	52-60
fatal cases, with necropsies	85-226
on tuberculosis and on the etiology of beriberi (by Acting Sanitary Inspector W. Havelburg)	280-282
smallpox in Middlesboro, Ky. (P. A. Surg. C. P. Wertenbaker) ...	616-620
of sanitary inspector at Yokohama, Japan	652-655
service on the army transport <i>Obdau</i> (Asst. Surg. A. R. Thomas). <i>Mississippi</i> (Asst. Surg. John Mc- Mullen)	696-699 705-706
<i>Chester</i> (Asst. Surg. S. B. Grubbs) .	707-711
<i>Minnewaska</i> (Asst. Surg. H. B. Par- ker)	712-714
<i>Roumanian</i> (Actg. Asst. Surg. J. S. Hough)	714-716
Resignations	16
Resolution submitted to the American Public Health Association by Dr. W. H. Sanders, health officer of Alabama	19
Revenue-Cutter Service, aid to	38
circular letter providing special accommodations for officers of	71
Revision of the regulations	27
Ribeirão Bonito, Brazil, yellow fever in	583
Rio Clara, Brazil, yellow fever in	583
Rio de Janeiro, statistics of the Pasteur Institute at, and report on the vac- cination institute of that city for the year 1897.	283, 284
yellow fever in, since 1849, with statistical tables	580-582
yellow fever in	580, 583
sanitary inspection at	651-652
Rivers, western, shelter for deck crews on	40
Rosenau, M. J., P. A. Surg., report on San Francisco Quarantine Station.	737-739
<i>Roumanian</i> , army transport, report of service on (Actg. Asst. Surg. J. S. Hough)	714-716
S.	
Sagua la Grande, Cuba, yellow fever in	584
St. Andrew, Jamaica, yellow fever in	584
St. Catherine, Jamaica, yellow fever in	584
St. Elizabeth, Jamaica, yellow fever in	584
St. James, Jamaica, yellow fever in	584
St. Louis Marine Hospital (report of P. A. Surg. W. G. Stimpson)	59
Sanders, Dr. W. H., resolution submitted by	19

	Page.
San Diego Quarantine Station, report on (Actg. Asst. Surg. W. W. McKay) ..	735-737
San Francisco Marine Hospital (report of Surg. J. M. Gassaway)	59
San Francisco Quarantine Station, report on (P. A. Surg. M. J. Rosenau)	737-739
Sanitary inspectors and guards, appointment of, on Texas border	716
San Salvador, yellow fever in	580
Santiago, Cuba, yellow fever in	584
sanitary inspection at	651
precautions at, order of Secretary of War concern- ing	689-690
Santo Domingo, Santo Domingo, yellow fever in	584
Santos, Brazil, yellow fever in	583
São Carlos de Pinhal, Brazil, yellow fever in	583
São Paulo, Brazil, yellow fever in	583
Sawtelle, H. W., Surg., report on marine hospital at Chicago, Ill.	53
Seamen, foreign, deaths of, to be reported to consul	42
Seamen, contracts for care of	60-68
Senate Document No. 232, Fifty-fifth Congress	34
Shelter for deck crews on Western rivers	40, 41
Sheppard, Hon. William B., collector of customs, Apalachicola, Fla., letter concerning sanitation of foreign vessels arriv- ing at Apalachicola	720
Sholapoor, India, plague in	634
Siboney, Cuba, yellow fever in	584
Singapore, cholera in	528
Sleeping room for crews plying the Mississippi River and its tributaries....	40, 41
Smallpox, inquiry concerning experience of officers with	71
in the United States	598-631
(table)	628-630
in New York	599-600
report on, in Birmingham, Ala. (P. A. Surg. G. M. Magruder)	600-602
table of cases of, in Birmingham, Ala.	602
report on, in Jefferson County, Ala. (P. A. Surg. G. M. Magruder) .	604-605
Newton and Pinckard, Ala. (P. A. Surg. G. M. Magru- der)	603-604
of diminution of cases of, in Jefferson County, Ala. (P. A. Surg. G. M. Magruder)	605-606
by weeks, of cases occurring in Jeffersou County, Ala. (P. A. Surg. G. M. Magruder)	606-607
in Cartersville, Ga.	607
Patton and Jasper, Ala	607-608
Alabama, résumé of work in suppressing (P. A. Surg. G. M. Magruder)	608-613
Middlesboro, Ky	613-622
letter from Hon. David G. Colson relative to... ..	613
telegrams relative to	613-616
reports on (P. A. Surg. C. P. Wertenbaker)	613-620
telegram relative to (Governor W. O. Bradley) .	615
report on (Asst. Surg. Hill Hastings)	620-622
in Fair Oaks, Ark	622, 623
investigation of reports of, in Charlotte, N. C	623, 624
in Little Rock, Ark	624, 625
Columbia and Sumter, S. C	625, 627
Smith, A. C., P. A. Surg., report on Gulf Quarantine Station	730-735
Soldiers and seamen of the Navy admitted to marine hospitals, rate of charge for	36

	Page.
South America, sanitary inspection at Rio de Janerio	651-652
South Atlantic Quarantine Station, report on (P. A. Surg. J. A. Nydegger) ..	726-728
Spaulding, Hon. O. L., Assistant Secretary of the Treasury, letter relative to inspection of emigrants at Italian ports	662
letter relating to transportation of troops to Tampa, Fla.	675
directing enforcement of quarantine regula- tions at Port Tampa, Fla.	676
Acting Secretary, letter concerning detail of Marine- Hospital Service officers for duty at Cuban and Porto Rican ports and on army transports	693-694
Specimen list of questions used in examination for appointment	32, 33
Sprague, E. K., P. A. Surg., article by, "Present status of the bacteriology of yellow fever"	428-431
State boards of health, regulations of, concerning transportation of dead bodies	801-807
State and local health authorities, relations with	745
Stations, immigration, summary of report from	39
statements of repairs made and needed	52-60
marine-hospital, list of	34
quarantine, list of	35
Statistics of the Pasteur Institute at Rio, and report on the vaccination institute in that city for the year 1897	283, 284
of service (tables)	457-524
mortality, tables of	776-800
Steamboat Inspection Service, aid to	38
Stephenson, J. W., A. A. Surg., report on marine hospital at Cincinnati, Ohio ..	54
Stimpson, W. G., P. A. Surg., report on marine hospital at St. Louis, Mo	59
directions to train inspectors	567-568
Stoner, J. B., P. A. Surg., article by, "Femoral hernia"	251
Straits Settlements, cholera in	528
Suggestions to persons living in cities infected with yellow fever	335-338
Summary of relief furnished Army and Navy	36
reports from immigration stations	39
Sumter and Columbia, S. C., smallpox in	625, 627
Surat, India, plague in	634
Sutures used in operations for hernia	268-270
Synopsis of interstate quarantine regulations	412-414
Syphilitic paralysis, a case of (by P. A. Surg. G. B. Young)	258, 259

T.

Tabb, S., Assist. Surg., report of service on army transport <i>Manitoba</i>	703-705
Table, comparative, of number of seamen treated, 1868-1898	457
seamen treated during fiscal year 1898	458
physical examination of	462
treated during year ending June 30, 1898, by districts	462
average duration of treatment in each district	463
ratio of, treated in hospital in each district	463
tabular statement, by districts, of diseases and injuries treated during the year ending June 30, 1898	463
North Atlantic district, patients treated in	463
Middle Atlantic district, patients treated in	470
South Atlantic district, patients treated in	476

	Page.
Table, seamen Gulf district, patients treated in	483
Ohio district, patients treated in	490
Mississippi district, patients treated in	495
Great Lakes district, patients treated in	500
Pacific district, patients treated in	508
treated at quarantine	514
statement, by districts, of causes of mortality	516
surgical operations	518
ratio of deaths from specific causes	522
ratio of deaths in each district	522
average duration of treatment in hospitals in each district, 1889-1898	523
mortality per 100 in hospitals by districts	523
ratio of deaths from specific causes, 1889-1898	523
nativity of patients treated in marine hospitals	524
dates of first frosts in 1897 and 1898	556
of all places infected with yellow fever, with dates of first and last cases, as reported, and total cases and deaths	557
showing localities infected with yellow fever, arranged in order of date of infection	558
deaths from yellow fever in Rio de Janeiro during the years 1850 to 1897	581
first six months of 1898	582
nationality of patients in the yellow fever hospital in Rio de Janeiro	582
mortuary, of the yellow fever hospital in Rio de Janeiro	582
cases of and deaths from yellow fever in foreign countries	585-584
of cases of smallpox in Birmingham, Ala.	602
smallpox in the United States	628-630
showing prevalence of plague in 1898	638
leprosy in Japan	643
statement of army transports arriving at Montauk Point, N. Y.	692
of mortality statistics, 1897	776-800
Taboticabal, Brazil, yellow fever in	583
Tahir, Brazil, yellow fever in	583
Tampico, Mexico, yellow fever in	584
Tax, tonnage	42
Telegrams relative to smallpox in Middlesboro, Ky.	613-616
Little Rock, Ark.	624, 625
Temperature charts	94, 96
Tennessee, regulations concerning transportation of dead bodies	806
Texas, appointment of sanitary inspectors and guards on the border of.	716
Brownsville, appointment of sanitary inspectors and guards at	716
Eagle Pass, appointment of sanitary inspectors and guards at	716
Laredo, appointment of sanitary inspectors and guards at	716
Thomas, A. R., Asst. Surg., reports of service on army transport <i>Obdam</i>	696-699
Tokyo Fu, cholera in	528
Tonnage tax	42
Tortugas Quarantine Station, report on, P. A. Surg. L. L. Williams	728-730
Toxic amaurosis, a case of (by Asst. Surg. J. B. Greene)	263
Traffic, regulation of, to, from, and through yellow fever infected towns.	370-372
Train inspection	441-454
service	389-411
Trans-Mississippi Exposition, Omaha, Nebr.	40
Treatment of yellow fever (Murray)	301-312
(therapeutic) of yellow fever (Geddings)	313-318

U.

	Page.
Uniforms, circular letter concerning.....	70
United States, smallpox in.....	598-631
(table).....	628-630
tables of mortality in cities and towns of, 1897.....	776-800
transportation of dead bodies in the.....	801-807
yellow fever in.....	529
Ununited fracture of femur, a case of (by P. A. Surg. G. B. Young).....	256-258

V.

Vera Cruz, Mexico, yellow fever in.....	584
Victoria, Brazil, yellow fever in	583
Vineyard Haven marine hospital (report of Asst. Surg. John McMullen)....	60
Virginia, regulations concerning transportation of dead bodies.....	807

W.

War Department, correspondence with, regarding army transports	672-716
War, Secretary of, letter requesting detail of Marine-Hospital Service officers for duty at Cuban and Porto Rican ports and on army transports....	693
Wasdin, Eugene, P. A. Surg., article by, "Hygiene of persons living within an area of yellow fever infection"	330-332
"On the value of the antopsis findings in cases that have died of suspected yellow fever"	432-440
report of investigation of yellow fever.....	587-590
tests of Sanarelli's serum anti-malarial.....	594-597
Weekly statements of the spread of yellow fever	558-565
Wertenbaker, C. P., P. A. Surg., report on marine hospital at Wilmington, N. C	60
report on smallpox in Charlotte, N. C.....	623-624
Columbia and Sumter, S. C.....	626-627
Western rivers, shelter for deck crews on.....	40, 41
Westmoreland, Jamaica, yellow fever in	584
West Virginia, regulations concerning transportation of dead bodies.....	807
White, J. H., P. A. Surg., detail to quarantine convention, Mobile, Ala.	18
article by, "Regulation of traffic to, from, and through yellow fever infected towns".....	370-372
"A précis on detention-camp management"	378-388
"Synopsis of the interstate quarantine regulations of the Treasury Department".....	412-414
"A concise explanation of the maritime quarantine regulations of the Treasury Department relating to yellow fever".....	421-424
report upon the yellow fever epidemic of 1897....	536-539
William Head, British Columbia, report of inspection of quarantine station at (P. A. Surg. S. D. Brooks)	667-669
Williams, L. L., P. A. Surg., report on Tortugas Quarantine Station.....	728-730

	Page.
Wilmington marine hospital (report of P. A. Surg. C. P. Wertenbaker)....	60
Woodward, R. M., P. A. Surg., article by, "Location of a bullet by X-ray" ..	231-232
report on Reedy Island Quarantine Station...	721
Wound of foot, a case of (by Asst. Surg. J. H. Oakley)	262
Wyman, Walter, Surgeon-General, report to Secretary	15-828
circular letter announcing death of Asst.	
Surg. Emil Prochazka	16
for the information of candidates	
for appointment into the Service	27-31
letter to the Secretary concerning aid to	
the Army and Navy	34
circular making marine hospitals available	
for the reception of the sick	
and wounded of the Army and	
Navy	35
fixing rate of charge for soldiers	
and seamen of the Navy admitted	
to marine hospitals	36
construing paragraph 470, Regulations Marine-Hospital Service,	
and fixing rate of charges	
for care of officers and men of	
the Navy	36
inspection blanks	44, 47, 49, 51
circular, contracts for care of seamen....	60-68
letter relative to leaves of absence of acting assistant	
surgeons....	69
grade, promotion, and pay	
of hospital	
stewards	69
pay of medical	
officers	69
employment of	
attendants in	
accordance	
with civil-	
service rules.	70
concerning uniforms	70
to medical officers concerning experience with	
smallpox	71
providing for special accommodations for sick	
and wounded revenue-	
cutter officers	71
requiring pathological	
specimens to be sent to	
the Hygienic Laboratory	71, 72
letter to Secretary transmitting articles	
on yellow fever	287

	Page.
Wyman, Walter, Surgeon-General, circular letters relating to post-epidemic disinfection.....	425-539
circular letters relating to post-epidemic disinfection and aeration.....	425-427, 540, 541
letter to Secretary refuting charges against Gulf Quarantine Station	530-533
letter to P. A. Surg. J. H. White.....	541-542
Surg. H. R. Carter	542-543
Secretary requesting authority to detail officers to investigate yellow fever in Habana.....	585-586
telegrams relative to smallpox in Middleboro, Ky.....	613-616
telegrams relative to smallpox in Little Rock, Ark	624, 625
letter relative to smallpox in Columbia and Sumter, S. C....	625, 626
proposed legislation for investigation of leprosy.....	646
vaccination in Habana	650, 651
requesting detail of medical officer in Honolulu.....	655-656
of instruction to medical officer detailed to Honolulu	656
regarding army transports	674-675
relative to quarantine regulations in Florida.....	676
convening board to investigate condition of steamer <i>Nietheroy</i> , afterwards United States cruiser <i>Buffalo</i>	683-684
letters and memorandums relative to quarantine precautions at Montauk Point, N. Y.....	686-689
instructions to medical officers serving on army transports	695
statement of, regarding quarantine legislation	761-766
circular relative to obtaining material for pathological instruction.....	825
Y.	
Yamagata Ken, cholera in	528
Yokohama, cholera in	528
Yellow fever, articles on (by officers of the Marine-Hospital Service):	
Its nature, diagnosis, etc. (Murray)	289-295
Diagnosis (Guitéras)	296-300
Treatment (Murray)	301-312
Therapeutic treatment (Geddings)	313-318
Hygiene of persons living within an area of infection (Carter).....	319-329
Hygiene of persons living within an area of infection (Wasdin)	330-332
Hygienic measures to be adopted by persons living within an area of yellow-fever infection (Geddings)	333, 334
Suggestions to persons living in cities infected with (Brunner).....	335-338

Yellow fever, articles on (by officers of the Marine-Hospital Service)—Continued.

	Page.
Précis on hygienic measures to be taken in a town infected with (Carter) .	339-357
Measures to be taken in a district threatened by (Carter).....	358-360
Measures to be taken in an infected and noninfected town (Glennan)...	361-366
Measures to be adopted to prevent propagation of, from an infected to a noninfected locality (Norman)	367-369
Regulation of traffic to, from, and through towns infected with (White). .	370-372
Communication with a town infected with (Carter).....	373-377
A précis on detention-camp management (White).....	378-388
Train-inspection service (Young).....	389-411
Synopsis of the interstate quarantine regulations of the Treasury Department (White).....	412-414
Précis of the United States quarantine regulations for domestic ports (Baillhache).....	415-420
Explanation of maritime quarantine regulations relating to (White)...	421-424
Post-epidemic disinfection (letters of Surgeon-General relative to).....	425-427
Bacteriology of (Sprague).....	428-431
Value of the autopsic findings in suspected cases of	432-440
Train inspection (Carter)	441-454
Yellow fever in the United States	529
origin and history of the epidemic in the South during the fall of 1897	529-578
report of Surg. J. H. White upon the epidemic of 1897.....	536-539
post-epidemic, disinfection	539
at McHenry, Miss.....	544-550
outbreak of, in Louisiana and Mississippi	544-578
at Franklin, La	550-555
table of dates of first frosts in 1897 and 1898	556
spread of, in Louisiana and Mississippi	556-558
table of all places infected, with dates of first and last cases, as reported, and total cases and deaths	557
showing infected localities, arranged in order of date of infection	558
weekly statements of the spread of	558-565
service measures for the suppression of	565, 566
directions of Surg. H. R. Carter to train inspectors	566-567
directions of P. A. Surg. Wm. G. Stimpson to train inspectors	567-568
directions for disinfecting railroad coaches	568-569
source of infection of, in Mississippi in 1898	570-578
in Cuba.....	578-579
Jamaica.....	579
San Salvador and Mexico.....	580
Rio de Janeiro.....	580
Rio de Janeiro since 1849, with statistical tables.....	580-582
Brazilian cities other than Rio de Janeiro.....	583
Brazil	583
table showing cases of and deaths from, in foreign countries... ..	583-584
investigations of causes of	584
in Colombia	584
Costa Rica.....	584
Cuba	584
Curaçao	584
Haiti	584
Jamaica	584
Mexico	584
Santo Domingo	584
Yucatan	584

	Page.
Yellow fever, report of investigation of (Surg. Eugene Wasdin)	587-590
report of investigation of (P. A. Surg. H. D. Geddings)	590-593
report of tests of Sanarelli's serum anti-amaryllie (Surg. Eugene Wasdin)	594-597
precautions in 1898	670
regulations for naval war vessels	670
letter relative to (Hon. J. D. Long)	671
(Hon. L. J. Gage)	671
United States Navy requested to intercept small craft and refugees from Cuba	671
letter requesting that transportation of refugees or effects from Cuba be forbidden (Hon. L. J. Gage)	672
forbidding transportation of refugees or effects from Cuba (Hon. Chas. G. Allen)	672
correspondence with War Department regarding army transports	672-716
Navy Department to forbid transportation of refugees or effects from Cuba	672
investigation of reported cases of	716-718
Yokohama, Japan, reports of sanitary inspector at	652-655
Young, George B., P. A. Surg., report on marine hospital at Delaware Breakwater, Lewes, Del.	55
articles by, "Incised wounds of arm and back"	252, 253
"Compound comminuted fracture of the skull"	253-255
"Ununited fracture of femur"	256-258
"Syphilitic paralysis"	258, 259
"Train-inspection service"	389-411
report on Delaware Breakwater Quarantine Station	722-723

